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VOLUME 40, No. 15

AMERICAN DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

JUL 28

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POLAR BRILLIANT REDS . . . six colors of striking liveliness and clarity, ranging from yellow to blue shades of red or pink. Especially suitable for woolens and worsteds intended for shrinkproofing—the Polar Brilliant Reds have good fastness to chlorine and retain their brilliance after any of the better-known shrinkproofing processes.

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The MOST EFFICIENT Equipment

FOR DYEING

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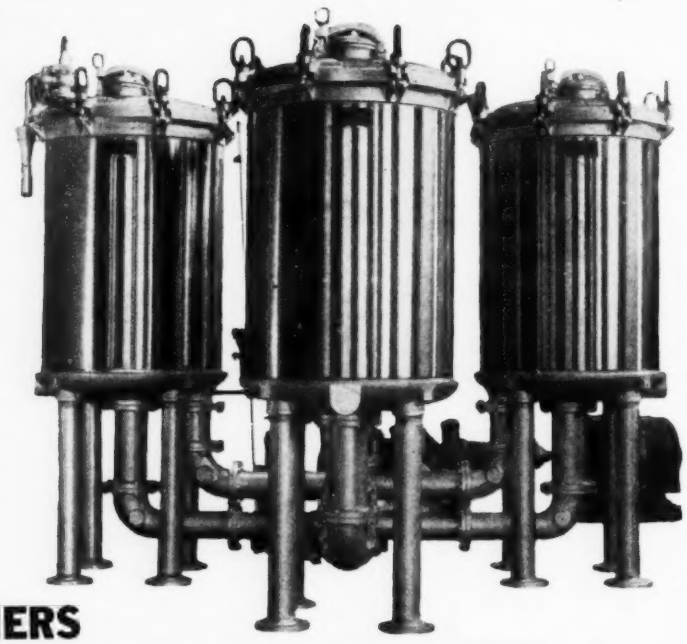

BEAMS OR CARRIERS

AT THE SAME TIME — IN THE SAME BATH

Dyehouses now using Gaston County multiple-kier dyeing machines for 30 years recommend them for (1) uniform dyeing results, (2) simplicity of operation, (3) flexibility, (4) economy.

Uniformity — From 1 to 6 beams or package carriers are dyed at the same time, same dye-bath, same conditions of temperature, pressure and flow, thus giving *absolute uniformity and evenness of shade.*

Simplicity — All kiers are operated from one circulating pump. No block-off drums are necessary, since each kier can be cut off from other kiers by valves. Control features include manual or automatic dye-liquor flow control . . . and the new electronic DYNAMASTER controls — unprecedented for accuracy, sensitivity, and simplicity of operation.

Flexibility — Multiple-kier set-ups may be easily rearranged into new combinations, to meet any change in production requirements. Machines are available for practically any size or design of carrier.

Economy — To save dyestuffs, the alteration in dye liquor ratio for any number of beams or carriers is held to a minimum. Operating kiers are positively blocked away from kiers not in use.

Write us, or ask our representative to explain fully the advantages of a Gaston County multiple-kier set-up.

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The Rudel Machine Co., Ltd.
614 St. James St., W. Montreal
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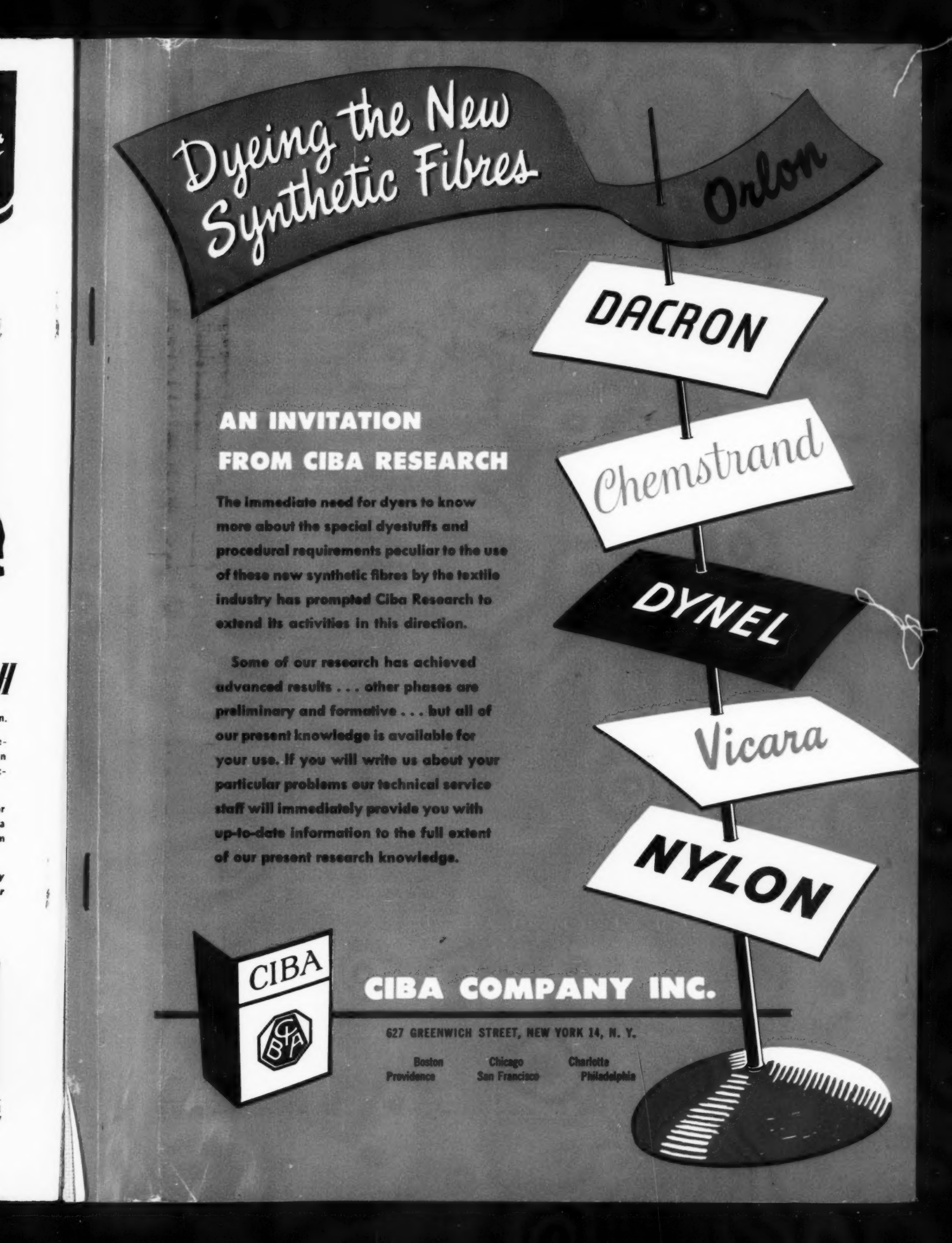
American Dyestuff Reporter, Vol. No. 15, July 23, 1951. Published every other Monday. Copyright 1951, by Howes Publishing Co., Inc., 44 E. 23rd St., New York 10, N. Y. Domestic subscriptions, $5.00; Canadian, $6.00; Foreign, $10.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.


Dyeing the New Synthetic Fibres
Orlon
DACRON
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AN INVITATION FROM CIBA RESEARCH
The immediate need for dyers to know more about the special dyestuffs and procedural requirements peculiar to the use of these new synthetic fibres by the textile industry has prompted Ciba Research to extend its activities in this direction.
Some of our research has achieved advanced results . . . other phases are preliminary and formative . . . but all of our present knowledge is available for your use. If you will write us about your particular problems our technical service staff will immediately provide you with up-to-date information to the full extent of our present research knowledge.
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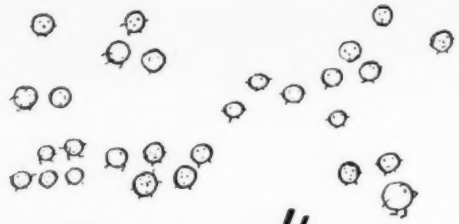

IT WAS like Times Square on New Year's Eve — individual particles agglomerated into a mass so thick that movement was barely possible. "Observe," said the chemist, "this very stiff mixture of titanium oxide containing 60% of solids." Cal and his brothers-in-arms awaiting their part in this demonstration were having difficulty keeping their balance on the spatula in the chemist's hand.

"Cal"Gon *disperses* Mob of Pigments

"ON THIS SPATULA I have some tiny glassy particles of Calgon®, three parts per thousand parts of pigment, to be exact. Watch what happens when I mix them into this paste of titanium oxide, now too thick to flow." Cal was suddenly dropped into space. Before he could yell "molecularly dehydrated phosphate" he found himself jostling a mob of particles being churned this way and that by the chemist's spatula.

AS CAL and his brothers merged into the crowd, clasped tightly to the lattice of each pigment particle, the chemist went on, "Could we observe what is happening at the surface of each particle, we would find that the ions of the complex phosphate are adsorbed on the surface of the solid particles."

"Adsorbed is it?" boasted Cal. "They are under my control." And with that made the pigment particles shift and scatter and flow unil they were rolling over and over in all directions.

"YOU WILL NOTE that the initially stiff paste is now almost fluid as water, although the solids content has remained unchanged," the chemist went on. "Here we have observed the unusually effective dispersive action of Calgon, put to good use in dispersing pigments in the finishing of textile fabrics."

One of the foremen at this class in the foreman's educational program remarked, "That is why we use Calgon in the delustering of rayon fabrics, to prevent those white spots we used to get."

THE CHEMIST pouring the thin slurry from one beaker to another replied, "Yes, and it can be used for any pigments such as clay, calcium carbonate, or colored pigments that may be used in finishing."

Then Cal reminded him, "Don't forget to tell them that I also soften the water in dyeing and control corrosion of the water system."

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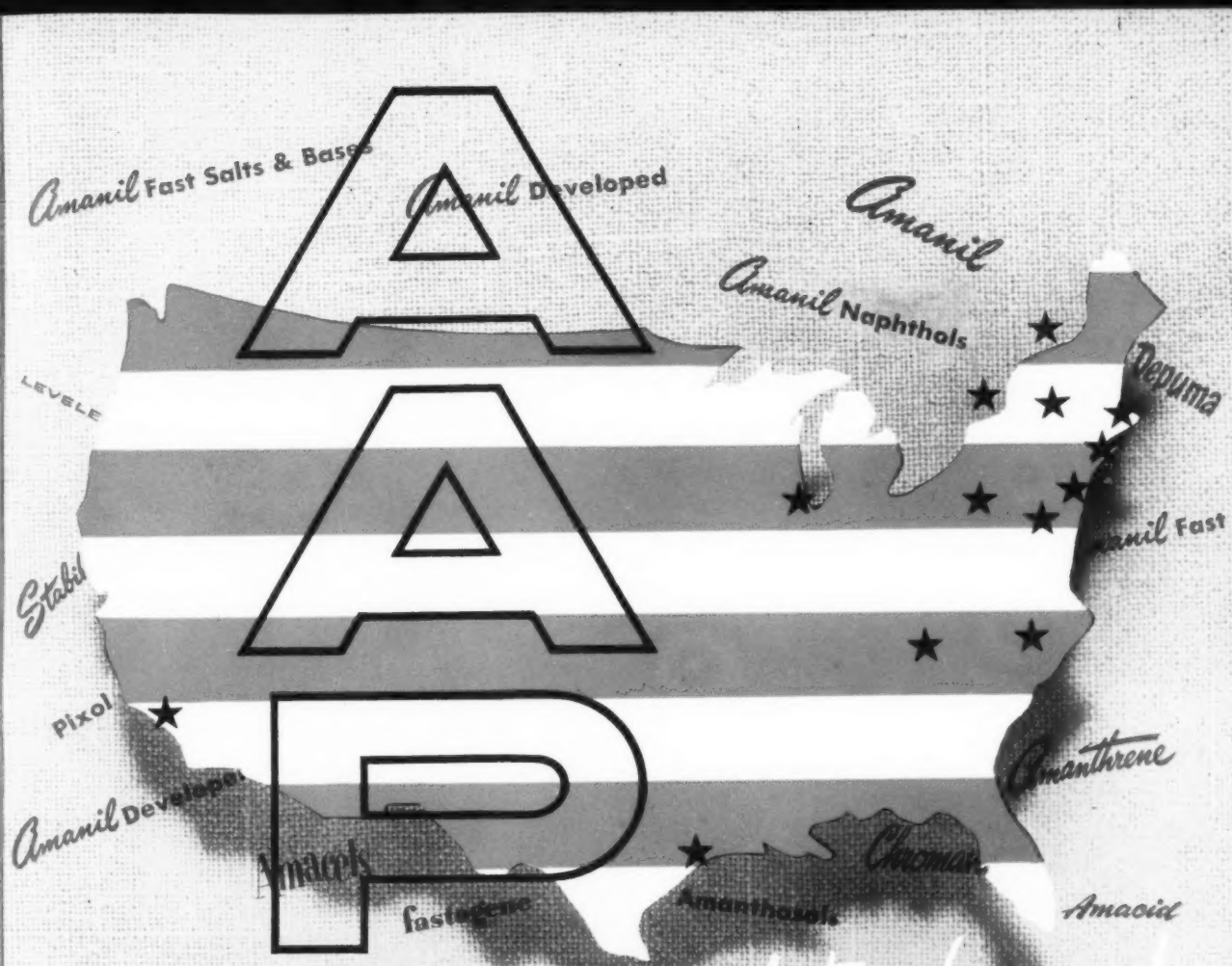

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*

EX

July 23, 19

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gives woolens, cottons and rayons a very desireable, soft full hand...

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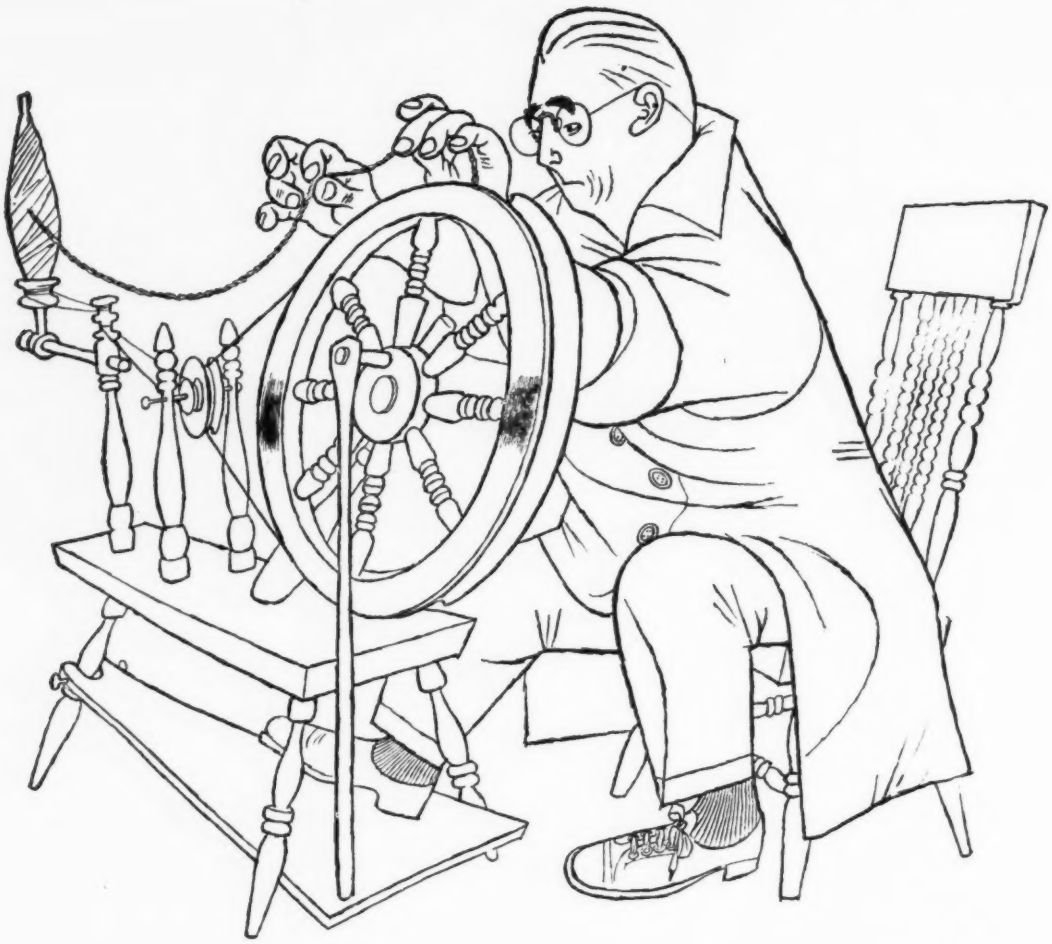

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the Armour man is the man to see because he has more different soaps and synthetics than anybody!

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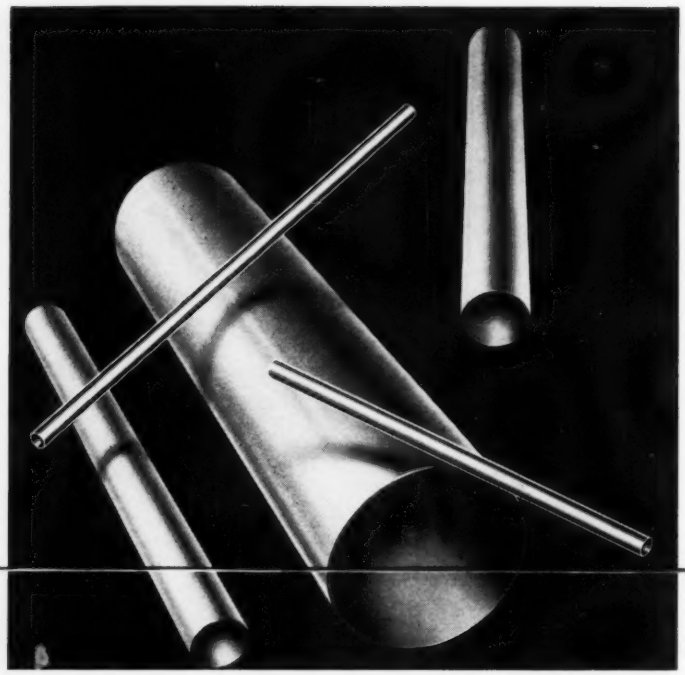

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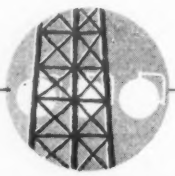

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Whether for fashion or industry, your yarns or fabrics will win greater favor, give greater service . . . and cost you less when they're processed with Laurel soaps, oils, finishes. Scientifically developed, laboratory-and mill-tested, these quality Laurel wet processing agents are pure, uniform, dependable. Only top grade raw materials are used. Since 1909, important wet processors have found Laurel processing agents yield smoother, more efficient production, more salable finished products.

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textile soaps, oils, finishes

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A revolutionary process developed by the General Dyestuff Corporation for dyeing cotton fabrics.

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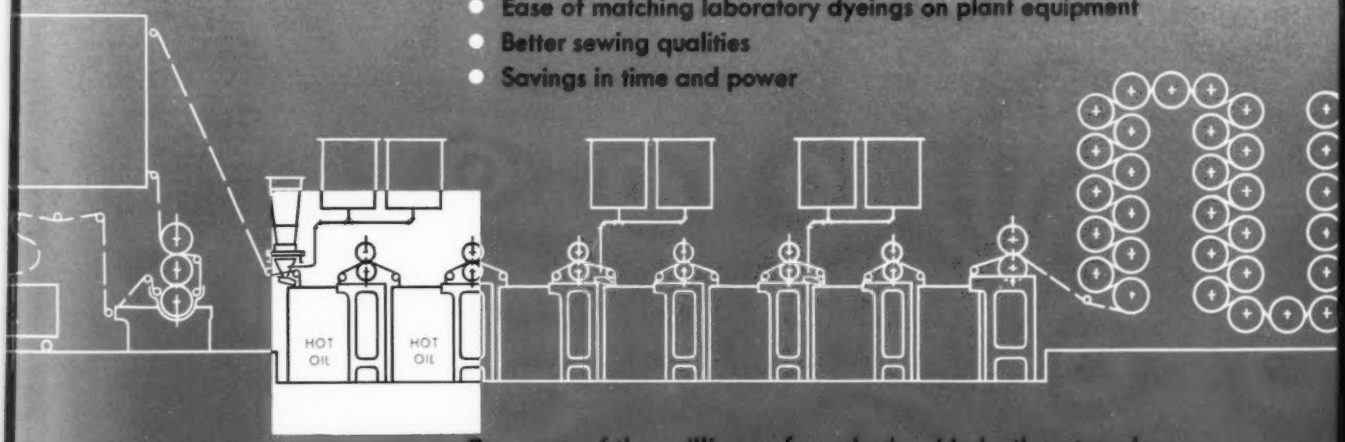
- Savings in dyestuffs and chemicals
- Complete control of shades
- Solidity of colors in pastel to dark shades
- Adaptability to long or short runs
- Ease of matching laboratory dyeings on plant equipment
- Better sewing qualities
- Savings in time and power



Because of the millions of yards dyed in both vat and sulphur colors by the **HOT OIL PROCESS**, General Dyestuff Corporation's Technical Department is able to answer your questions on its adaptability to your requirements.

Inquiries should be addressed to our nearest office.

GENERAL DYESTUFF CORPORATION

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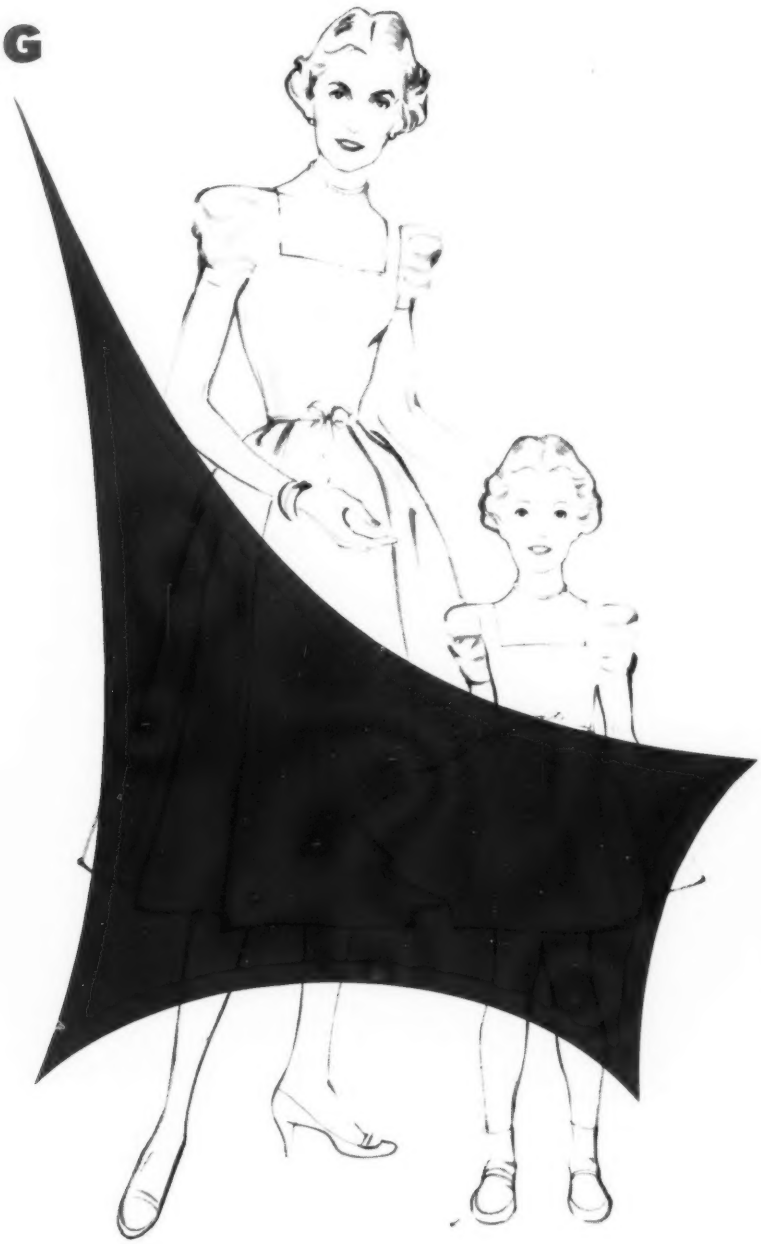
EASTONE SCARLET BG



for plain dyeing of acetate and nylon

If you handle acetate or nylon, Eastone Scarlet BG belongs in your drug room. This widely used Eastman dye produces brilliant shades of scarlet and fire red on acetate with slightly bluer shades on nylon.

On either fabric the dyeing characteristics of Eastone Scarlet BG are tops—rapid exhaustion plus good leveling at high or low temperatures.

Eastone Scarlet BG stains viscose and cotton but slightly and is easily cleared. Thus, cross dyeing of plaids and novelty fabrics is economically accomplished.

For self shades or for combinations resulting in warm browns, tans and greys—for the best in color value use Eastone Scarlet BG.

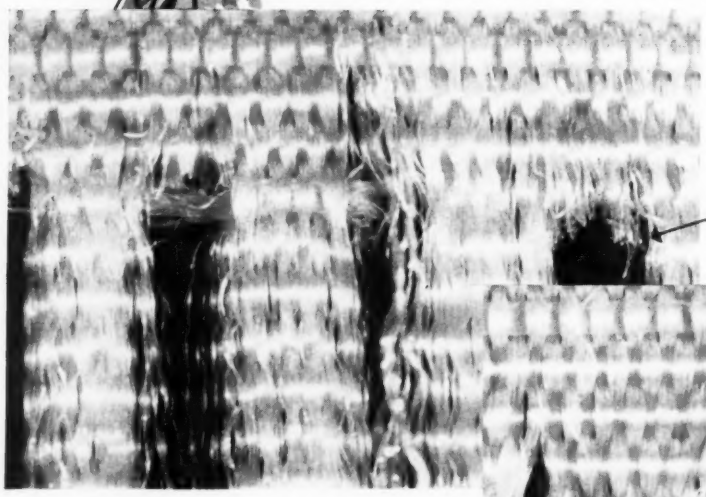
If you are not already using Eastone Scarlet BG, we will be pleased to send you detailed information and sample quantities for your evaluation. Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.

Eastman Acetate Dyestuffs

Eastman Acetate Dyestuffs are sold in the United States through Tennessee Eastman Company in Kingsport, Tennessee and Lodi, New Jersey. On the West Coast, through Wilson Meyer Co.: San Francisco, Los Angeles, Portland and Seattle. In Canada, through Clough Dyestuff Company Ltd., 33 St. Mathieu Street, St. Laurent, Quebec.

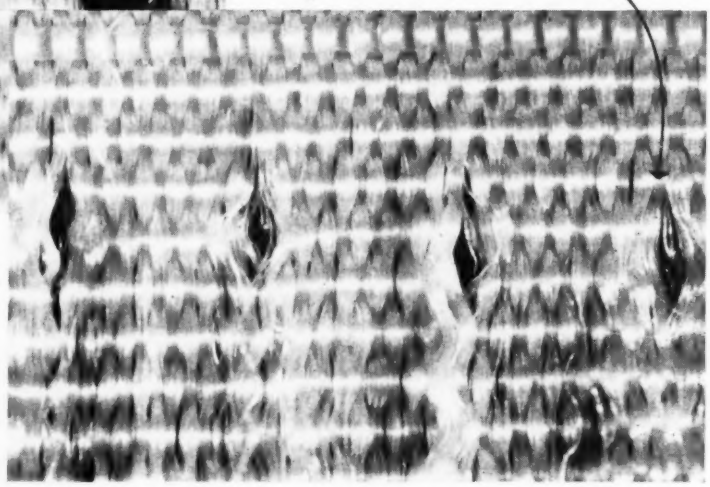
WEAK AT THE SEAMS... UNTIL FIBERS WERE LUBRICATED WITH PROFINE

What causes a well constructed fabric, sewed on modern machines, to exhibit excessive weakness at the seams? The pictures below tell the story.



Picture No. 1 shows the seam of a suiting fabric produced by a well known manufacturer. Needle damage . . . cut threads . . . can be observed where the fabric threads have been unraveled.

Seam threads pulled out here



Picture No. 2 shows a sample of the same suiting fabric . . . pre-treated *with Profine* and sewed under identical conditions. Needle damage is absent . . . no cut threads here!

Profine controls softness, body and hand. If your knitted or woven fabrics require a full-bodied hand, you can get it with Profine. This efficient finishing agent gives you good whites that won't discolor . . . provides good anti-curl cutting . . . permits high speed sewing.

Profine is designed to up-grade fabrics . . . to increase their saleability. Try it.

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Procter & Gamble
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MAKERS OF OLATE, PROXOL AND ORVUS PRODUCTS FOR BETTER TEXTILE PROCESSING

July 23,

Three new improvements for finishing synthetics

Now Monsanto's SYTON . . . a uniform, microscopic silica . . . is applied on the padder or jig for three major advantages:

1

Scroop: For the development of scroop on nylon marquisettes, rayon linings, satins, taffetas, ribbons. Also, *luster control* on sheers, linings, taffetas, lingerie fabrics, and elastic webbings.

2

Worsted-like hand takes the place of the regular synthetic's smooth, slippery finish. On viscose-acetate suitings and rayon-wool blends, for example, a fine dry hand is obtained by using Syton with urea or melamine formaldehyde resins.

3

Slippage-Control on filament-type fabrics including nylon, viscose and acetate. Syton puts a frictional "tread" on slippery surfaces of synthetics, provides slippage control, prevents distortion and shifts in weave.

Syton is compatible with a wide variety of finishing agents. No curing or after-treatment is necessary.

Free Booklet—Take advantage *now* of the special finishing effects and the *job advantages* that Syton can give you. Write today for specific information, or for Monsanto's new booklet: "Syton In Textile Finishes." Syton: Reg. U. S. Pat. Off.

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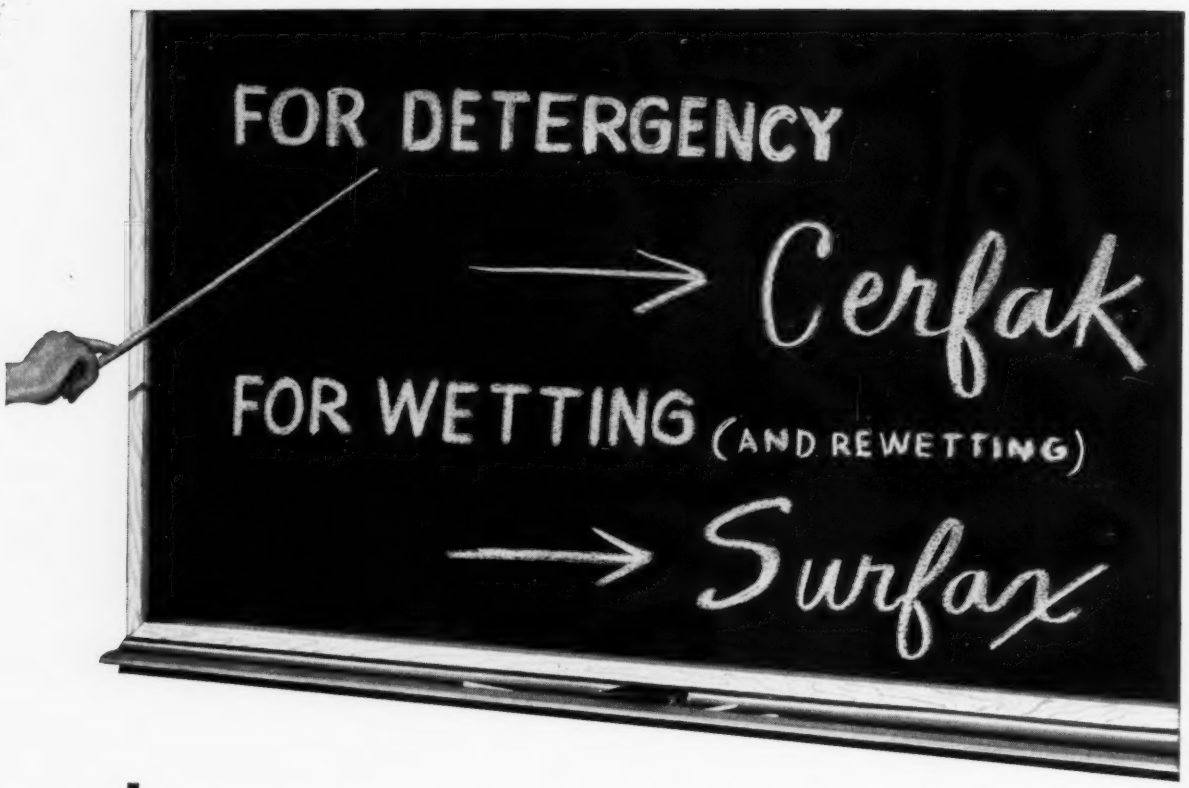

It's easy to remember... for Wet Processing, rely on these two Houghton brands!

The entire Houghton line of surface active agents is identified by two trade names —"Cerfak" and "Surfax." When *detergency* is the chief factor in your processing, pick one of our seven "Cerfak" products and you'll be right every time. When you want exceptionally good wetting and rewetting power, a "Surfax" agent will solve your problem. In applications where *both* detergent and wetting action are needed, there's a "Cerfak" available for excellent results.

Many textile mill men are using the Houghton Chart in choosing surface active agents for specific processing jobs. It was developed after fifteen years of textile research by Houghton engineers. It will help you choose the agent with detergent and/or wetting properties for any mill application. We will gladly send you one of these charts. Write to E. F. Houghton & Co., Philadelphia 33, Pa.

ASK THE HOUGHTON MAN
to show you how "Cerfak" and "Surfax" concentrated products are improving quality at lower cost for many mills.

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Ready to give you on-the-job service . . .

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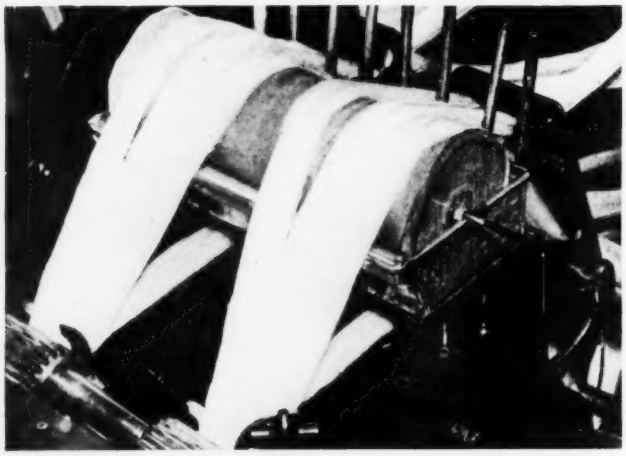
the ¢ FEW extra ¢ents that make a LOT of sense

When it comes to producing worsted yarn, there is always this important question: Should a spinner spend a few more cents than absolutely necessary when processing top, to try and achieve more efficient production and better finished products? In the case of Nopco* 1656-R, the answer is "yes".

Today, the price of top is the highest in history. Thus the few additional cents involved in the purchase of Nopco 1656-R become insignificant in the face of over-all costs. Moreover, the unique advantages afforded by this remarkable oil far outweigh its price differential when compared to alternatives. Just consider:

NOPCO* 1656-R...



1 ***provides excellent lubrication and eliminates static in worsted sliver. Result: no fly from top treated with this oil—fewer ends down in spinning and winding—much less brush waste;***

2 ***increases the drag, and thereby gives a better draft—resulting in more even and cleaner yarn;***

3 ***scours out with phenomenal ease—actually converting into suds when used with alkali, polyphosphate and water;***

4 ***applies equally to all production systems—American, Bradford or French—and is extremely advantageous on pin drafters.***

*Reg. U. S. Pat. Off.

Yes, it will profit you to use Nopco 1656-R wherever you employ a lubricant in your top-processing procedure. And it will profit you to specify Nopco 1656-R, as a number of spinners already do, whenever you purchase oil-combed top. You'll pay a few more cents above "rock bottom" perhaps, but when you examine your finished yarns, you'll know you have produced high quality products with surprising economy.

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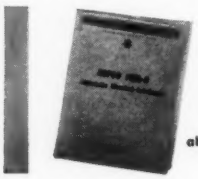

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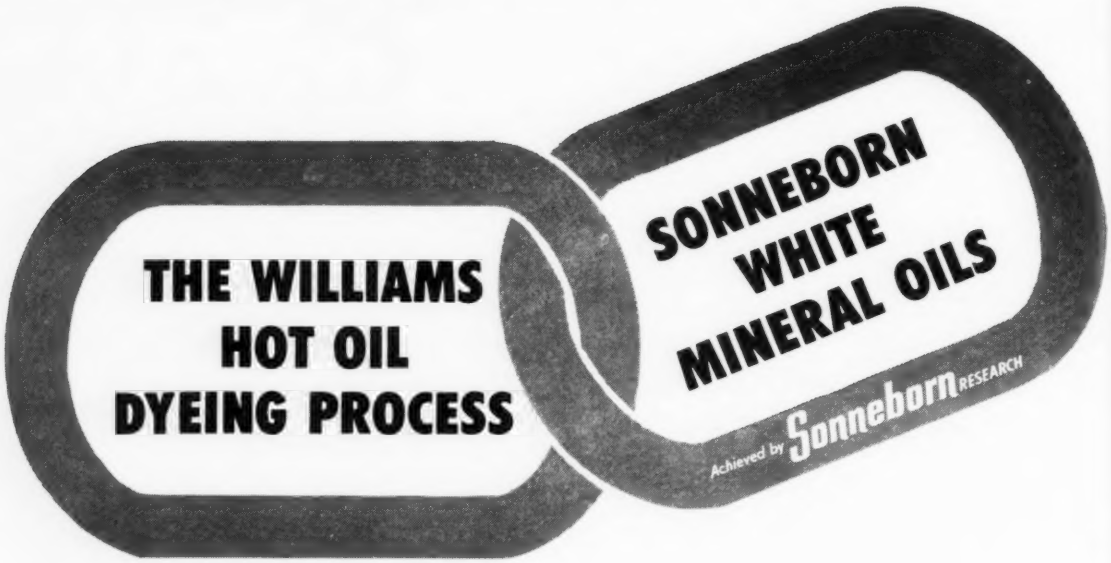

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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists.

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JULY 23, 1951
VOLUME 40 NUMBER 15

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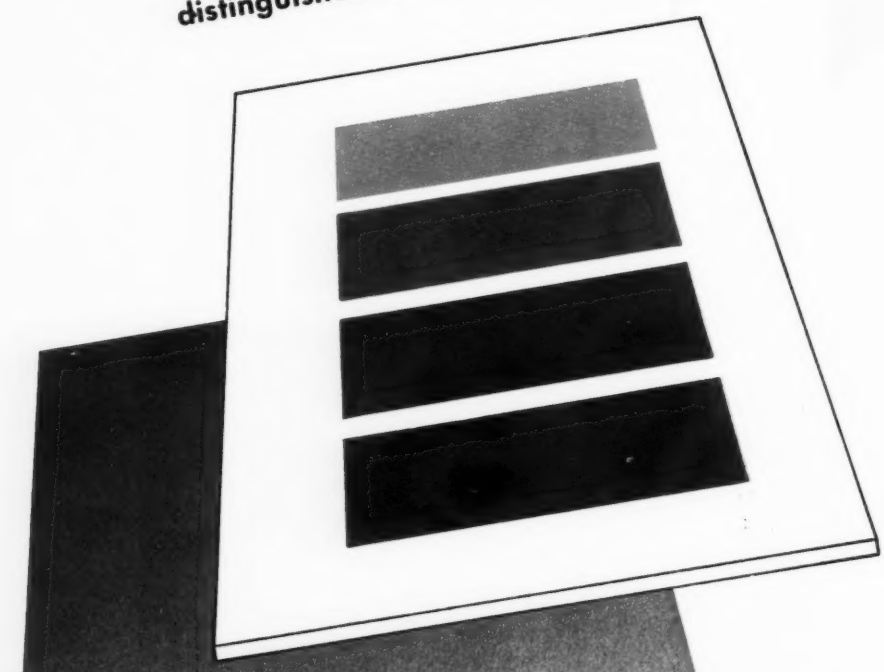

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Proceedings of the
American Association of Textile Chemists and Colorists

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JULY 23, 1951

ONE HUNDRED AND SEVENTY-SEVENTH COUNCIL MEETING

THE Council held its 177th meeting at the Hotel New Yorker, New York, N Y, on Tuesday morning, June 26, 1951. Present were President C Norris Rabold presiding; J Robert Bonnar and George O Linberg, Vice Presidents; William R Moorhouse, Treasurer; William H Cady, Carl Z Draves and P J Wood, Past Presidents; Leonard S Little, Chairman of the Research Committee; Edward B Bell, John M Gould and Frank J O'Neil representing Northern New England; Edward J Allard, Raymond W Jacoby, Robert W Joerger and Alden D Nute representing Rhode Island; J Edward Lynn representing Western New England; Carl H Brubaker, Charles W Dorn, Ralph M Fischer, Herman E Hager, Paul J Luck and Henry L Young representing New York; Albert E Herrmann, Jr representing Hudson-Mohawk; James Dixon, Morton H Klein, Lloyd O Koons, Ernest E Rettberg, Jr, Charles A Sylvester and Frederick V Traut representing Philadelphia; Linton C Reynolds, Henry A Rutherford and Sumner H Williams representing Piedmont; C Russell Gill representing Southeast; Kenneth H Barnard of the Conventions Committee; William A Holst of the Technical Programs Committee; Albert E Johnson of the National Institute of Cleaning and Dyeing; Patrick J Kennedy of the Student Contest Committee; Albert E Sampson, Assistant Treasurer; George H Schuler and Glenn D Jackson, Jr, of the Publicity Committee; Percival Theel, Chairman of the Publications Committee; and Harold C Chapin, Secretary.

The Secretary's report of the 176th Council meeting and financial report of June 15 and also the Treasurer's report of June 20 were accepted. The budget submitted by the Appropriations Committee for the year beginning August 1 was approved.

A new proposal defining duties and authority of the Committee on Conventions, presented by K H Barnard, Chairman of the Committee, was referred back to that Committee, and the Committee on Constitution and Bylaws, for further study. A proposal in the April Council meeting, regarding the allowance for education and military experience in qualifications for senior membership, had not received adequate attention from Mr Linberg's committee, and was left with that committee for report at the next meeting. The Secretary's request for signatures on ballot envelopes in the last election was approved, and on recommendation of the tellers, signatures were voted a requirement for acceptance of ballots in future general elections, with understanding that the relation of vote to individual voter would be observed by no one. The Secretary was authorized to stencil the name and address of each member on the ballot envelope mailed to him.

Professor Theel reported that the next *Year Book* would be out in September. A conference with other organizations was proposed, to establish standard forms of expression in textile chemical literature. Earlier publication of papers in the Reporter is planned, through more in one issue when occasion demands. For the American Dyestuff Reporter award, three papers will be chosen by the screening committee from those published up to July 1. Each member of the Publications Committee will then rate these by number for the purpose of determining the winner. It was recommended that the compilation and publication of a cumulative index of the Reporter be deferred in favor of more immediately pressing work. The first edition of *Analytical Methods* had already shown a substantial profit, and was still on sale. A revised edition would be ready for publication next year. The pamphlet on dyehouse mathematics would be ready for publication in August of this year. Chapters of the *Vat Dye monograph* were practically complete, and it was hoped that editing could be completed this summer. Copies of the bulletin on Apparatus and Materials Used in Tests of the AATCC had been mailed to members of the Council and Research Committee, and more were available from the Secretary. Mr Cady reported on the *Colour Index* and Mr Jacoby on the *Vat Dye monograph*. Mr Schuler reported on publicity.

Representing the Corporate Membership Committee, Mr Linberg reported a gain of over a thousand dollars in Corporate and Sustaining membership dues over last year, but stressed the need of a much larger gain in the year to come to meet an increased budget for research. Another printed report would be issued soon to Corporate members, with copies to Council and Research Committee. Another would be mailed with Corporate bills in December.

Mr Little explained the need of additional funds to increase present research salaries and equipment, and to engage an assistant director of research. He described plans for a meeing of the Research Committee in New York on September 28, followed by dinner at Rochelle Park, N J and the showing of Mr Appel's pictures of the trip abroad. The President and Mr Little discussed the Textile Conference in Brighton, England, the International Standards Organization meeting in Bournemouth, conferences on the *Colour Index*, and other foreign visits as far as Switzerland. They reported a cooperative attitude toward acceptance of our tests or compromise, with greatest differences on fastness to light and perspiration, and in the use of our more costly special equipment.

Mr Luck reported exhibition space at the New York convention practically sold out. He requested immediate notification from Section officers of their representatives on the Reception Committee. Mr Dorn said there might be a special train from the South. Relative to the Intersectional Contest, Mr O'Neil reported eight entries, with possibility of a ninth. Mr Kennedy said there would be three student papers, but no contest.

The Photo Products Department of E I duPont de Nemours & Co, Inc was elected to Corporate membership. Each of the following was elected to the class of membership specified as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

SENIOR

I L Bailey
E P Bebeau
J A Bertrand
J A Brazel
J C Brooks
C H Carlson
M A Cherof
W F Chivall
J M Chuck, Jr
J H Collie
P W Cook
J Dammicci
H Elkin
J D Emmart
H S Falls
F Farrington
A C Ferguson
A A Gallinger
A P Garant
E Haigh
W M Harger
J M Harvey
M Heist
G H Jeffrey
M L Jewell
A H Jonsson
L F Kollek
P J LaMonica
Y K Lee
M J Lydon
F V Mahoney
E L Martin
V C McCollom
J S Mitchell
A L Peluso
M M Pollard
J N Scott
H F Smith
F A Soderberg
M Stauber
G M Steinberg
A Stelnik
S M Suchecki
F M Tolin
J F Tomlinson
A R Watson
R M Williams
H C Woodruff

JUNIOR

R H Burrows
L K Harvie, Jr
D N Koenig
J F Martin
L M Meduski
W M Segall
M L Valasquez M
T A Venia

ASSOCIATE

W H Abernethy
I Alois
C Barany
D V Capuano
L J Cassidy
N G Cooper
T W Creech
H Holtzman
S Katz
H A Langensiepen
H Leach
H B Martin
E J Mandell
H J Paquin
H E Parks
R A Schlaak
M V Trexler

STUDENT

F Baldevskul
L R Beck, Jr
L H Collins
A A DeAraujo
C DeGreiff
A Ginsburg
J Hyman
G R Parker
J A Patterson
W J Romaine
D L Wheeler
J S Williams

Transferred from another classification to Senior membership:

J C H Dempsey

Respectfully submitted
H C CHAPIN
Secretary

SECRETARY'S FINANCIAL REPORT — JUNE 15, 1951

	Applications	*Dues, Regular & Reinstate*	*Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received and transmitted to Treasurer					
Aug 1, 1950 to April 2, 1951	$3,422.00	$40,310.00	$44,735.00	$14,438.06	$102,905.06
April 2 to June 15, 1951	831.50	387.00	585.00	2,950.76*	4,754.26
Totals in fiscal year to June 15	4,253.50	40,697.00	45,320.00	17,388.82	107,659.32
Leaving deposited by Treasurer with Secretary					9,723.78
Miscellaneous items					*
Dividends & interest					719.90
Reporters & reprints					20.70
Year Books					282.00
Crockmeters					511.00
Crock cloth					349.80
Multifiber cloth					263.55
Moth cloth					64.16
Water test apparatus					185.75
Dyed standards					39.00
Knitted tubing					180.80
Gas fading units					51.10
Buttons					4.00
Color transfer charts					102.50
Colour Index					60.00
Analytical Methods					77.00
Cotton skeins					35.00
Standard grease wool					4.50
					$2,950.76

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

51-9

Education: High School.
Experience: Boss Finisher, Printing plant.
Age: 50; married; references.

7-9, 7-23

51-12

Education: BTC, Lowell Textile Institute
Experience: Six years textile chemist and dyer on animal fibers and synthetics; eight years process development, fiber technology and purchasing, vegetable fibers.
Age: 34; married; references.

7-23, 8-6

51-13

Education: BS with graduate work in chemistry
Experience: Chief Chemist, dyes and intermediates
Age: 48; married; references; vicinity of New York preferred.

7-23, 8-6

Report of New York Section Outing

THE Annual Outing and Golf Tournament of the New York Section was held on June 15th at the North Jersey Country Club, Wayne Township, New Jersey. There was a total attendance of about 350 with 205 golfers.

Emil L Grilli, Stein, Hall & Co, Inc, was the winner of the golf tournament with a low gross of 79. In a playoff of the triple tie of last year, Robert W Brewer, Line Chemical Corp, was the winner. A J Gard, Monsanto Chemical Co, was low for guests with a 79. Low net for members was won by Edwin G Frick, Allied Textile Printers, Inc, with a score of 85-15, 70. Low net for guests was won by E Luckroft, Burlington Mills, with a score of 111-42, 69. The following qualified for the kickers with net scores of 76: A L Peiker, Calco Chemical Division, American Cyanamid Company; E Barbero; Charles A Whitehead, *American Dyestuff Reporter* (eventual winner in a draw); Michael P Mulqueen, Hatters Fur Exchange, Inc; Joseph S Lange, Geigy Co, Inc; Stephen J Luscian, Calco Chemical Division, American Cyanamid Company; Al Castra; and S Ostrow, Herbert Kuhl, Herbert Kuhl Co, Inc, was high with a score of 168.

In the horeshoe pitching contest R Durfee Damon, Lockwood Dutchess, Inc, was the winner. N Stack was second and William R Zimmerle, Swiss Bleachery, was third.

Prizes were awarded to winners in all contests and many other prizes were also distributed, the main award being a television set which went to Leon P Brick, Onyx Oil & Chemical Co.

The committee for the event consisted of Ernest J Gsell, Gsell Textile Screen Printing Corp, *Chairman;* Fred L Gonnerman, Carbic Color & Chemical Co, *Prizes;* Chris W Farrell, Bick & Co, *Golf;* and Robert F Holoch, National Aniline Division, Allied Chemical & Dye Corp, *Horseshoes.*

Respectfully submitted,
NORMAN A JOHNSON,
Secretary

PHOTOS TAKEN AT THE NEW YORK SECTION OUTING

Souther to Head Piedmont Section

R HOBART SOUTHER has been named Chairman of the Piedmont Section for the coming year according to an announcement made at the Section's annual outing at the Ocean Forest Hotel, Myrtle Beach, S C, on June 29-30. The new slate of officers, in addition to Mr Souther, includes: J C Whitt, *Vice-Chairman;* M M McCann, *Secretary;* Herman J Jordan, *Treasurer;* Joseph Lindsay, Jr, *National Councilor;* A R Thompson, *Custodian.*

The Sectional Committee will consist of John S Beattie, Wilford Sargent, Clarence Hooper and Russell G Lawrence. Student Contest Committee officers for 1952 include R T Smith, *Chairman,* D A Torrence and C O Stevenson.

The third annual Student Paper Contest, which is sponsored by the Piedmont Section, will be held in April, 1952, at which time the Clemson College Student Chapter will be host. The Contest will be held in conjunction with the Piedmont Section's regular Spring Meeting at Clemson. Other future dates for the Section include the Annual Meeting in Charlotte, N C, on September 22 of this year and the Winter Meeting in Winston-Salem, N C, during January, 1952. John Neely has been appointed chairman of a committee to investigate other locations and dates for the 1952 outing, which has been held at Myrtle Beach for several years past.

At the Saturday night banquet, Section Chairman Edwin A Briggs, presiding, introduced National President Rabold, who made a few brief remarks relative to his trip to England.

Dr H Y Jennings, in charge of the Research Committee, reported on progress being made on the Section's Technical Paper, which will deal with various phases of resin finishes. Mr McCann was appointed acting secretary of the Committee in the absence of Linton Reynolds.

W D Livingston had complete charge of the outing plans.

PHOTOGRAPHS TAKEN AT THE PIEDMONT SECTION OUTING MYRTLE BEACH, S C, JUNE 29-30, 1951

Front row (l to r): Chester Cobb, C Norris Rabold, Edwin Briggs, T R Smith, R Hobart Souther, Dr H Y Jennings
Back row: J C Whitt, Wyss Barker, W D Livingston, M M McCann, A Henry Gaede, A R Thompson.

Ladies at the Head Table, Ladies Luncheon

Front row (l to r): Mrs Chester Cobb, Mrs Wyss Barker, Mrs A Henry Gaede, Mrs T R Smith, Mrs A R Thompson, Mrs J C Whitt
Back row: Mrs M M McCann, Mrs John Neely, Mrs Norris Rabold, Mrs James J Marshall, Mrs W D Livingston, Mrs H Y Jennings.

New York Section———

DYEING BY THE HOT-OIL PROCESS*

S H WILLIAMS
General Dyestuff Corporation

In practically all continuous dyeing, fabrics are impregnated with dyestuff in a padding operation. In the first application of continuous dyeing to vat dyestuffs, the padded dye was in a reduced state; later, unreduced pigment was employed in the pad. The padded material was run into a booster box, or into two booster boxes of very large volume, where fiber could come into equilibrium with reduced dyestuff so as to obtain a dyeing of satisfactory penetration and quality. The attainment of equilibrium between padded fabric, from which padded dyestuff tended to bleed off, and a large volume of reduced dye, which had the reverse tendency of going onto the fiber, meant that, at the end of every run, large quantities of dye and chemical were left in the booster boxes. It also meant that many yards of goods were run before equilibrium was fully established. Furthermore, the solubilities and stabilities of vat-leuco compounds at practical operating temperatures limited the method to light and medium shades.

S H Williams

In recent years the trend in continuous vat dyeing has been to bring about equilibrium between fiber and leuco compound more quickly by the use of higher temperatures and in shorter volumes by various expedients. The pad-steam method developed in both Europe and America and the newer molten-metal method developed wholly in Europe have employed both principles to improve continuous vat dyeing. The Williams Unit, in which volume of booster liquor is minimized by the use of very narrow channels for the fabric, was developed by the author of the article that follows as another eminently successful approach to the problem of continuous vat dyeing.

Now this inventor of the Williams Unit has discovered that practical dyeing temperatures well above 212°F and a liquor volume amounting to only the pickup of fabric in an aqueous solution can be obtained in a conventional Williams Unit by the utilization of hot mineral oil as the medium in which wet cloth is heated to a high temperature. As the reduced dyestuff has virtually no solubility in hot oil, bleed-off is eliminated and equilibrium of dye with fiber is attained.

INTRODUCTION

THE process of dyeing textiles continuously with quick fixation in the presence of hot oil was discovered in the Charlotte laboratory of the General Dyestuff Corporation. The method and the results obtained were exciting from the time the first dyeings were produced. It was immediately determined that many dyestuffs and combinations of colors could be dyed more efficiently by the hot-oil process than by existing methods. As with any new process, there are still a number of problems that require extensive investigation to obtain complete information about the usefulness of the new method for all different classes of dyes, for different fabric constructions and for the many new synthetic fibers now being manufactured.

The hot-oil process was developed during a study in which hydrocarbon waxes were used in a liquid state in an attempt to seal off the top area of a dye bath. Observations made during these trials led to the investigation of high-viscosity white mineral oils with high boiling points. We worked with Nujol in our initial laboratory test runs, this product being a U S P white mineral oil sold commercially for medicinal purposes.

The discovery of the value of the process for the quick reduction of vat colors came about in a simple manner. Not having available the boiling temperature of the oil with which we were working, we attempted to boil a large sample of the oil and to measure the boiling temperature. Our laboratory thermometers would not register above 400° F, so we were uncertain of the temperature we obtained when we, without thinking, suggested a sample of cotton cloth be immersed in this hot oil, which had reached a temperature of perhaps 600° F. The sample of cotton cloth had been padded previously with a liquor containing 1 pound of Indanthrene Blue BFP Double Paste per gallon and then dried. It had also been saturated with a cold solution of caustic soda and hydrosulfite. A minor explosion took place when the cold, wet sample was immersed in the hot oil. The cloth was thrown from the beaker on immediate contact. The results were a messed-up laboratory bench covered with oil and some nasty remarks concerning the party responsible for suggesting such a foolish experiment. When the sample of cloth was finally retrieved, it showed, in spots, a perfect development of shade. The intense color value indicated that we had, for the first time, seen a flash reduction of a vat color in a full shade, done in a fraction of a second.

It was from this observation that we continued our experiments. Our next step was to work out a practical procedure for applying this flash method of reduction of vat colors continuously at these exceptionally high temperatures.

EXPLANATION OF STEAM-IN-OIL EMULSION

When a fabric saturated with water is immersed in a bath of hot oil at temperatures well above the boiling point of water, a violent reaction takes place between water and oil. The water is almost

* Presented before the New York Section in Rochelle Park, N J, on May 17, 1951.

immediately transformed into water vapor, and a high percentage is trapped in the oil bath. These water vapors, which do not readily escape from a bath of hot oil, produce a high-temperature steam-in-oil emulsion. The water vapor in its attempt to break through the surface of the oil creates a rapid increase in the volume of the emulsion. This rapid expansion in volume explains why it is necessary, at the start of dyeing operations, that the mechanism be only half full of oil. It can readily be observed that, if this reaction is confined to narrow channels of considerable depth, the machine involved plays an important part in the successful operation of the process. The small visible amount of steam coming off the surface of this emulsion is evidence of the high retention of water vapor in oil even at operating temperatures of 240 to 250° F.

Extensive laboratory work was carried out long before practical application of the hot-oil process was attempted. The very first plant runs proved the method sound, and these initial trials were successful. Although the method is unorthodox, it was immediately adopted by a number of plants. In one area where a plant bought a tremendous quantity of white mineral oil, a temporary shortage developed, and we were accused of having contributed to an increase of constipation in the community.

PROCESS SHOWS RAPID DEVELOPMENT

Present indications are that the use of hot-oil dyeing has extensive possibilities in the art of continuous color application. Although the time since its introduction has been short, a number of plants in the country are now successfully dyeing difficult shades and many fabrics, using hot oil. This past week before coming to this meeting, I roughly checked the yardage that had been dyed. Over eleven million yards had been processed satisfactorily. One plant in the South, during the past few months, had dyed over a half million yards of Hydron navy and a quarter million yards of dark vat green. Both shades, because of their extreme depth, were formerly produced on jigs. A substantial savings in dyes and chemicals was shown on both these heavy shades, but, most important to the plant, was the excellent shading of the lots when results were compared against jig work.

Dyeing with hot oil seems simple, but I would like to point out that, no matter how simple a dyeing procedure may be, it can still be fouled up by experts.

We have made mistakes and have run into difficulties in some plants, but the principle of this dyeing method is sound and the majority of the results obtained confirm our beliefs.

In the experimental stages of this development we attempted to keep the process secret and confined our work to a few plants until we were certain it was practical. In our effort to gain time, we were severely criticized for not giving information out generally to the industry. I would like to explain that it has never been our intention or policy to confine the process to any one selected plant. The reason for our delay in publicizing the process was simply that we did not want to create an impression that we had a workable method before it was tried, tested, and proved to some degree in practice. One thing we found out is that it is not possible to keep news about new processes secret from the textile industry. There seem to exist special systems for obtaining information concerning what is going on. These systems seem to surpass in efficiency those that are used by the F B I.

I do not believe that there is another industry that has as many products to work with, as many problems that need solving, and as many methods that need improving as the dyeing and finishing industry.

The hot-oil dyeing process gives to the dyer and chemist a new avenue for approaching and overcoming a number of the problems that still exist in color application. Like any new process, it will have to be evaluated against presently known methods. It is not a panacea for all dyehouse problems. But the method does give to us, for the first time, a means of working with solutions high above the boiling point of water without resorting to closed mechanisms. Past studies have clearly indicated the value of elevated temperature in color fixation. Dyeing times have been shortened from hours to seconds when working temperatures range from 240 to 250° F.

To apply the process of continuous dyeing with hot oil and to obtain maximum efficiency, the nature of the mechanical setup is of utmost importance. The art of successful color application not only requires the ingenuity of the dyer but the resources of the chemist, plus the physical aids of modern engineering. A combination of these skills is necessary in the operation of today's up-to-date plants. Too many failures in present dyehouse practices can be attributed to poor mechanical equipment. Investments made for discarding obsolete equipment and replacing it with the latest engineered developments pay dividends. Managements that fail to retool and keep abreast in this fast-moving age soon occupy poor competitive positions.

CONTINUOUS RANGES FOR THE DYEING OF VAT COLORS

The following suggested mechanical layouts are sufficiently versatile to be well suited for the dyeing of vats and other classes of dyestuffs, either by the hot-oil or water-phase methods. A modern continuous range for dyeing most effectively by the hot-oil method consists of the following equipment:

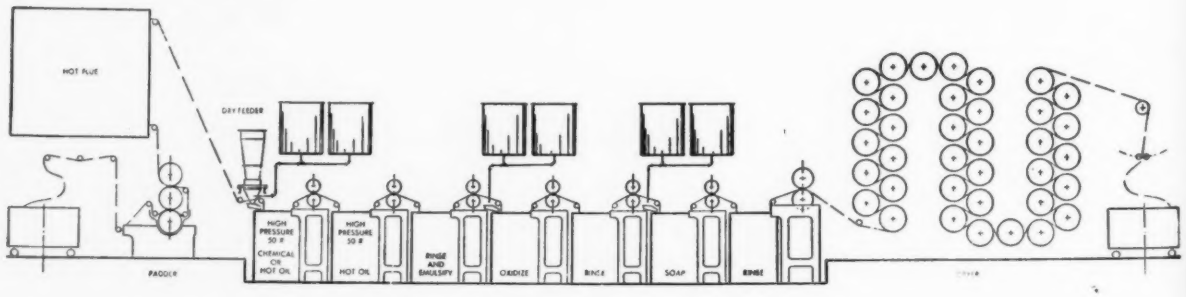

Figure 1

CONTINUOUS VAT-COLOR APPLICATION

A practical plant layout for the continuous dyeing of vat colors by the hot-oil process is suggested by the drawing of the Morrison All-Purpose Range shown above.

1 padder, two- or three-roll
1 A & G hot-flue dryer
7 Williams Units in range

An alternate setup is as follows:

1 padder, two- or three-roll
1 A & G hot-flue dryer
3 Williams Units
1 open washer

Should a plant have room for only two Williams Units in front of a range, the emulsifying operation can be carried out in open boxes, followed by a conventional washer.

Plants that run a large percentage of shades by reduced padding on only lightweight fabrics need only one Williams Unit following the pad for running this process. The single unit is followed by a conventional washer.

PRESENT OIL METHODS FOR DYEING VAT COLORS

Three methods of applying vat colors by the hot-oil process are in use. They are distinguished as follows:

Method 1

Padding of vat pigment, drying of wet fabric, treating with reducing chemicals, reduction in hot-oil unit.

Method 2

Padding of vat pigment, treating of wet fabric with reducing chemicals, reduction in hot-oil unit.

Method 3

Padding with reduced vat-dye solution, passage of wet fabrics through hot-oil unit.

Following passage through the hot-oil unit of all the above-mentioned methods, the next operation is a cold rinse containing an emulsifying agent for removal of oil. Continuous oxidation, rinsing, soaping, and rinsing complete the conventional processing of a vat dyeing.

EXPLANATION OF CONTINUOUS METHOD I (Pigment dried)

The continuous predrying of vat pigments on certain fabrics is a well-known, established practice. The two important advantages obtained by running dried fabrics are the following: better appearance of finished dyeings, and more accurate control of the chemical unit.

The fabric is padded with pigment color in the conventional manner and dried through a hot-flue dryer in a continuous operation. The first Williams Unit is used for application of caustic soda and hydrosulfite. The temperature in this unit normally is from 90 to 120° F. Theoretically, it would be more advisable to maintain a cold chemical unit, but, actually, there are many constructions of cloth that require some leveling action of the dyestuff in order to produce a slight diffusion of color before the dyestuff is completely reduced in the oil bath. Although a rise in the temperature in the chemical unit causes a slightly greater rate of color bleed-off, it allows easier maintenance of temperature in the oil unit without interference of control in the chemical pad.

Generally speaking, heavy constructions, such as twills, drills, poplins, oxfords, ducks and gabardines, dye to the best advantage when the pigment has been dried before development.

HYDRON BLUE—The dyeing of Hydron Blue in navy shades continuously has always been a problem. Plants now using the hot-oil process claim excellent shading results when comparisons are made against their present continuous methods. A practical formula for dyeing this color is as follows:

Padder
1 lb Hydron Blue RG Paste per gallon pad liquor
Hot-flue Dryer
Drying of pigment-padded fabric
1st Williams Unit
Temperature 120°F
2 gal pad liquor
2 oz dry caustic soda per gallon of total volume
4 oz hydrosulfite per gallon of total volume
2nd Williams Unit
50 gal oil at 220 to 230°F
3rd Williams Unit
Initial charge
3 lb Igepal CA Extra High Conc
Feed per 100 gallons of feed liquor
6 lb Igepal CA Extra High Conc
4th Williams Unit
Initial charge at temperature of 140°F
6 lb bichrome
12 lb acetic acid, 56%
1½ lb Igepal CA Extra High Conc
Feed per 100 gallons feed liquor
30 lb bichrome
45 lb acetic acid, 56%
1½ lb Igepal CA Extra High Conc
5th Williams Unit
Hot wash
6th Williams Unit
Initial charge
1 lb Igepal CA Extra High Conc
2 lb Igepon T Gel
4 lb soda ash
Feed per 150 gallons feed liquor
2 lb Igepal CA Extra High Conc
4 lb Igepon T Gel
8 lb soda ash
7th Williams Unit
Hot wash

NOTE: The concentration of caustic soda for Hydron Blue is low by comparison with that recommended for anthraquinone vat blues.

INITIAL CONCENTRATIONS OF CAUSTIC AND HYDROSULFITE IN CHEMICAL UNIT FOR VAT DYEING

	Caustic Soda Dry oz per gal	*Hydrosulfite oz per gal*
Light shades	1 to 1½	1 to 2
Medium shades	1½ to 2	2 to 3
Heavy shades	2 to 3	3 to 4

NOTE: In the dyeing of Hydron Blue or other special vat colors, the chemical concentrations are changed from the above to suit the nature of the dyestuff.

NOTE: Small quantities of pad liquor are added to the chemical unit at the start of a run. Normal amounts range from 2 to 4 gallons. In cases where the bleed-off of certain types is not in relation to the other colors in the formula, additional quantities of the color in question are added in excess of the other dyes in the pad liquor.

EXPLANATION OF CONTINUOUS METHOD II (Pigment wet)

This second method of applying vat colors may be carried out on constructions of cloth that do not require intermediate drying. The same operations are followed in this method as when the cloth is dried. The chemical unit in this case is allowed to overflow slightly to make up for the dilution of chemicals from the water that is carried into the chemical bath by the cloth. It is necessary to increase the concentration of caustic soda and hydrosulfite to a greater degree in the feed for maintenance of starting concentrations when wet cloth from the pad carries water into the chemical unit.

The choice of wet or dry method depends upon the appearance of the final dyed fabric as found by actual experience. Some constructions, such as certain broadcloths, give excellent results in both heavy and light shades by the wet method. Other fabrics, on the other hand, give distinctly better results by the dry method.

EXPLANATION OF CONTINUOUS METHOD III (Reduced)

The third method of padding with a prereduced solution of vat dye may be used successfully on certain light shades and on some qualities of fabrics. In the padding of reduced vat color, the pad box must be designed to minimize the problem of color exhaustion. This is best done by using a close-fitted pad box built around the bottom roll and by running the cloth straight through the nip. A pad for this operation should be set up as closely as possible to the hot-oil unit so as to prevent any excessive oxidation of the reduced color in its travel from the pad to the unit. The limitations that govern reduced dyeing are the depth of shade and the character of the vat colors employed.

THE WILLIAMS CHEMICAL UNIT COMPARED WITH CHEMICAL PAD

In the continuous application of vat colors by the hot-oil process, it is necessary that fabrics be evenly and properly saturated with chemicals before flash reduction takes place in hot oil. In the study of plant runs, particularly on heavy goods, it has been found that considerable savings are realized in consumption of hydrosulfite when chemical treatment is carried out in a Williams Unit instead of a pad. This is due to the fact that fabric and solutions are not aerated in passage through a Williams Unit as much as they

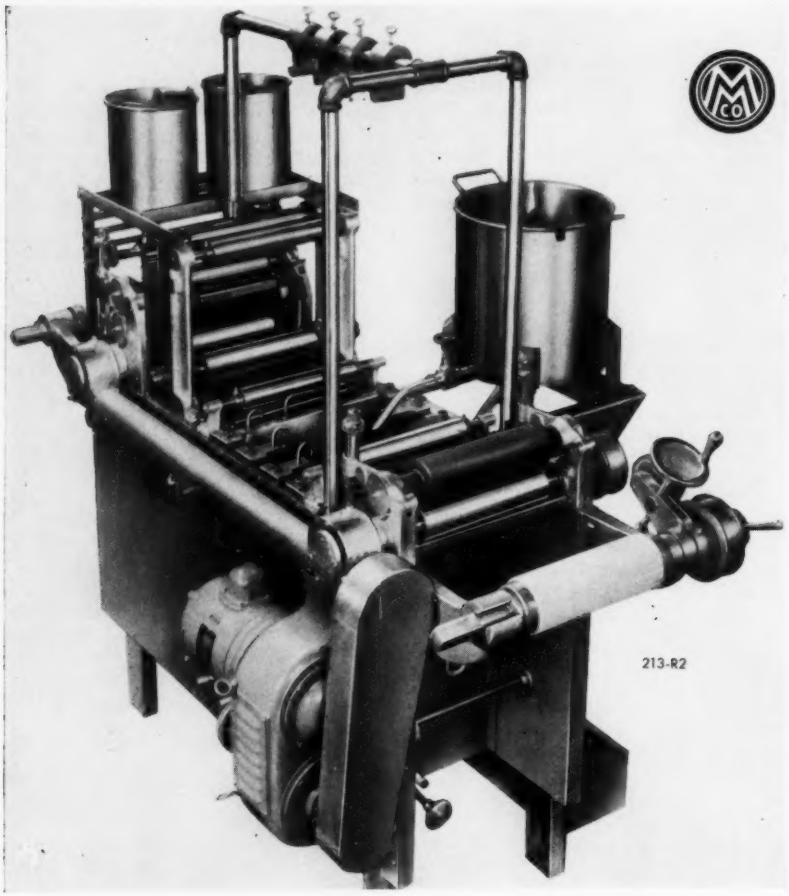

Figure 2

Combination Laboratory 3-roll Microset Padder and Williams Unit with 2-roll Microset Nip.

are in a padding operation. A better saturation of the fabric is obtained because of a greater yardage of completely submerged fabric in contact with solution. This is especially true when cloth is not dried after pigment padding as the immersion in a pad is too short to permit complete displacement of water in the fiber by chemical solution, especially at high speeds, and reduction is not so quick and thorough.

Any appreciable exposure of chemically saturated cloth to air would permit significant oxidation of hydrosulfite and would lower the efficiency of reduction. As a Williams Unit for hot oil can usually be placed closer to a Williams Unit employed for chemical saturation than to a chemical pad, less oxidation of hydrosulfite is a further normal advantage of the use of a unit for chemical saturation.

Some light constructions and certain shades may be saturated satisfactorily with reducing chemicals on a padder but with greater consumption of hydrosulfite.

REDUCTION UNIT

In continuous vat dyeing, proper reduction at operating speeds is the key to success. To fulfill this condition, it is necessary to maintain a temperature of 214 to 250° F in accordance with the type of vat dye and its concentration.

It is necessary that as much air as possible be prevented from entering the reduction bath during the dyeing operation. The hot oil emulsions, into which the reducing chemicals are carried, should not be aerated as they would be in an ordinary open compartment. During high-speed operations, a fabric carries a certain amount of air into the oil emulsion. It is therefore necessary that all rollers be covered at all times with steam emulsion. Any excessive aeration of the solution or of the cloth in its travel in and out of the solution would tend to reduce the efficiency of this vital part of continuous vat dyeing.

High-pressure steam coils (125 to 150 pounds) should be avoided in the oil unit with oils of limited heat stability. Oil emulsions will not flow freely around such coils, and excessive surface temperatures bring portions of oil under excessive, constant, high-temperature attack, causing some oils to smoke and break down. I mention this point, as this has been tried in a few cases where higher temperatures were attempted over what could be produced from the steam chest, and the results were not satisfactory.

ADVANTAGES OF A WILLIAMS UNIT FOR CONTAINING STEAM-IN-OIL EMULSION

A smaller amount of oil initially is necessary to cover a fabric completely in a Williams Unit than in a conventional compartment, a larger yardage of fabric being completely immersed in a confined area. This comparatively low volume of steam-in-oil emulsion at the same time is evenly circulated past the moving fabric.

A desirable feature of the Williams Unit is its ability to maintain even temperatures around all working areas about the material because of its utilization of a completely enclosed steam chest. The deep, narrow channels in which the steam-in-oil emulsion is formed retard water vapors from breaking to the surface. The violent physical reaction which takes place when fabric is entered into oil and even circulation of steam-in-oil emulsion produce ideal conditions for the uniform flash reduction of vat dyestuffs. By confinement of the formation of steam-in-oil emulsion to a closely restricted area, the resultant physical turbulence is held in proximity to the surface of the cloth, and dyestuff and fabric can receive the full impact of flash reduction. Reduction times are thus shortened considerably when a Williams Unit is employed.

It has been established that some movement and diffusion of color take place on the surface of the fabric during reduction in a hot-oil bath. This movement is very slight but does aid considerably in producing a level, smooth, and solid dyeing.

It has been observed that very close temperature tolerances need not necessarily be maintained during dyeing operations. Many of the dyestuffs tested show the same color values at 220 as they do at 250° F. There are some dyestuffs, particularly in full depths, that are best developed in the range of 240 to 250° F. Minor changes in temperatures throughout a run have not resulted in shaded goods. Temperatures in all cases, however, should not fall below 214° F.

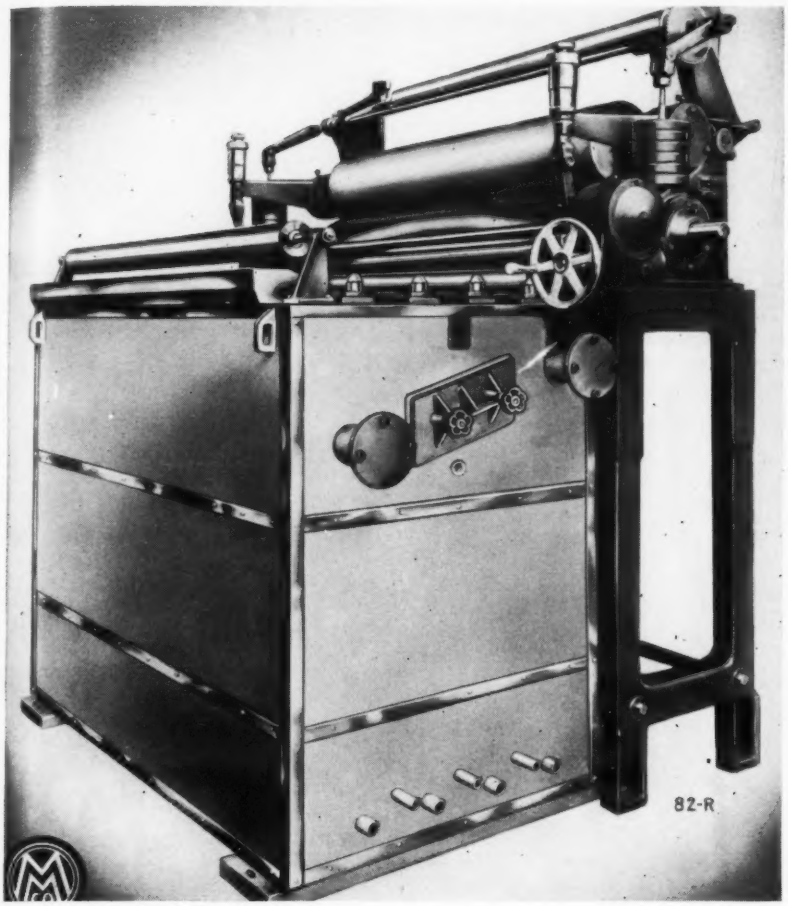

Figure 3

Stainless Steel Williams Unit with 5-ton Microset Nip Stand——Entering End.

EMULSIFICATION OF OIL

Following the hot-oil unit, the first unit or open boxes should contain cold running water. To this bath is added an emulsifying agent, such as Igepal CA Extra High Conc. A running overflow is maintained at this unit, and a mixture of emulsifying agent and cold running water is fed continuously to remove as much oil as possible. If the fabrics are of such a nature that retention of oil is great, emulsifying agents may be added also to the baths following the cold rinse, that is, it may be necessary to add an emulsifying agent in the oxidizing bath and small amounts to the soaping boxes. Among the products tested to date we have found the Igepals best suited for emulsifying the mineral oils used in the hot-oil process. Uniform turbulence of emulsifying solution along the length of a fabric passing through the narrow channels of a Williams Unit furnishes a favorable mechanical condition for removal of oil from the surface of the cloth. We hope to have available shortly experimental results showing comparisons of various emulsifying agents for removal of oil.

For efficient removal of oil, we recommend that the emulsifying unit be charged at the start of operations with ½ oz of Igepal CA Extra High Conc per gallon of liquor. A feed containing 1 oz of Igepal per gallon is allowed to flow into the unit while the goods receive a cold running wash, the amount of the feed being regulated to maintain good emulsification of oil.

DYEING SULFUR COLORS

There are many advantages in the application of sulfur dyes by the hot-oil process. The dyeing operation is relatively simple. In many cases it is not necessary to use the large-type immersion boxes for padding the sulfur color. Either a two- or three-roll pad may be used for this type of dyeing, the type of pad depending upon the character of the goods. The padding solution is made up in the normal way with sulfur dye, sodium sulfide, and soda ash, the temperature in the pad box being maintained as closely to the boil as possible. The material is run directly from the pad into a hot-oil bath, where complete fixation of dyestuff takes place. Rinsing, oxidation, rinsing and soaping follow the oil treatment in the normal manner. Many comparisons show that color values by this method excel those obtained by present practices. Fabrics dyed with sulfur colors by the hot-oil process appear to be smoother and more lustrous, and the colors take on an added sheen.

A Williams Unit is especially advantageous for applying sulfur colors when longer immersion times are required, or when dye concentrations are too heavy for padding.

DYEING DIRECT COLORS

It has been found that many direct dyestuffs that are not soluble in oil may be continuously applied by the hot-oil method. The procedure is as follows:

Pad the dissolved dyestuff at the boil and run the goods directly into a hot-oil unit. Give the goods a cold rinse in the presence of an emulsifying agent and dry.

Only a limited amount of dyeing has been carried out with direct dyes by this method up to the present time, but laboratory results indicate that the procedure has excellent possibilities.

CHANGES OF DESIGN IN THE NEW HIGH-PRESSURE WILLIAMS UNIT

Although much yardage has already been processed on conventional Williams Units, it was seen that a few mechanical changes in design would permit the hot-oil process to be carried out more efficiently. The first series of Williams Units carried all removable baffles clear to the top of the machine. These particular models are not well suited for hot-oil reduction, as oil, since it is more viscous than water, does not return quickly enough through the side returns to keep the first well filled to a proper level. These early machines may be used as chemical units, however, being entirely satisfactory for this operation. In the units of the second series three of the four baffles were lowered so as to allow some flowback over the tops of the baffles. An evaluation of the hot-oil process may be carried out on these later units with the lower baffles, but these machines, like

those of the first series, are limited in speed of operation because they carry only 15 pounds of steam pressure and thus cannot maintain a temperature of 240 to 250° F. The new models now being built carry a steam pressure of 50 pounds in the steam chest, the temperature of saturated steam at this pressure being 297° F. The new machine will allow for operating temperatures within the desired range for high-speed operation. About the best speeds we could obtain with units carrying 15 pounds of pressure was 60 to 90 yards per minute, depending on the cloth weight. High-pressure units carrying 50 pounds of steam pressure will permit operation up to 125 yards per minute even when heavy fabrics are being run.

To accelerate the flow of oil in the new models the channels have been widened slightly and the bottom rolls have been raised somewhat higher off the bottom of the wells to give more space for rapid passage of oil from one channel to another. Both baffles and top rollers have been lowered considerably in the unit itself in order to produce a large top area for the steam-in-oil emulsion to flow back over the baffles. This added space allows a greater area of action of the steam-in-oil emulsion and eliminates the hazard of the bath spilling over the sides of the unit. These changes in the new machine do not lessen its efficiency for operation with water solutions. The newer mechanism is therefore extremely versatile; it can be used as a dyeing unit for many processes. It can also be adapted for other phases of wet finishing, such as chemical treatments, emulsification, washing, caustic recuperation and soaping.

It is recommended that the squeeze rolls on the hot-oil-unit be covered with Neoprene rather than natural rubber. Neoprene withstands the attack of high-temperature oils.

Stainless steel is used in the construction of the hot-oil-unit as active metals, such as iron or plain steel, may promote oil breakdown at elevated temperatures.

VARIOUS MINERAL OILS

There are available to the industry hundreds of mineral oils with varying characteristics and a wide range of boiling points. It would take an endless amount of time to test so many oils on a practical scale. We hope, however, that we shall soon be able to procure an oil tailor-made to meet the exacting specifications that we can now set up from the experience we have already had on a large scale. Although our laboratory methods, which are semipractical, for testing these oils have been greatly improved, the final proof of an oil for the hot-oil process must be obtained from actual plant operations.

The oils used in this process are inert water-immiscible liquids having no substantial dissolving power for the dyestuff composition or its ingredients. We have tested oils of varying viscosities, and this characteristic does not seem to be as critical as we first were led to believe. A satisfactory oil must have the power to promote and hold the formation of the steam-in-oil emulsion when water-moistened fabric is completely submerged in a bath. A great many oils of varying properties have been used successfully. Such oils are generally saturated hydrocarbons, being nonaromatic petroleum-base products having boiling points from 248 to 600° F. We believe it preferable to use oils having a boiling-point range from 350 to 600° F. Silicon oils (i e, hydrocarbon-siloxane polymers, such as polymethylphenylsiloxane) and chlorinated or fluorinated higher-boiling nonaromatic hydrocarbons can be used. Silicon oils are too high in price at present for this particular commercial use.

UNSATISFACTORY OILS — Aromatic and unsaturated hydrocarbons, halogen derivatives thereof, and organic esters are generally unsuitable because of their dissolving power for vat or sulfur dyestuffs or for their leuco compounds. Unsaturated hydrocarbons are unsuitable because they tend to discolor on extended use. Fatty oils and fatty acids also are unsuitable since they saponify in the presence of the alkalis employed in the dyeing of vat and sulfur colors. Theoretically, a small amount of an oil-soluble emulsifying agent, such as mono-oleoylpolyethyleneglycol, could be added to the oil to enhance the steam emulsifying properties of the bath; however, in practice, we have found that it is best to avoid any such additions to the oil bath. Chemical additions of this nature, although they would promote steam-emulsifying properties, cause certain dyestuffs to split off and discolor the oil more rapidly. It is necessary that water-immiscible oils be inert toward all the components of the dye compositions employed.

Although we have used mostly white oils in this process, amber-colored oils should be as satisfactory, provided they are nonaromatic and possess the other necessary features.

An ideal oil would possess a high flash point, a high boiling point, and low viscosity; it would not dissolve any components of the dye composition; it would have antioxidizing properties; and it would be readily emulsifiable.

SPECIFICATIONS OF SATISFACTORY OILS—We list below the specifications of a few oils that are being used in practice (see table at bottom of page). Retention-percentage figures were taken from laboratory dyeings made on a heavy twill from which the oil had not been thoroughly emulsified. These figures are to be used for relative comparisons only; they do not reflect actual retention figures of oil left in goods processed in practice.

From a cost standpoint, we have not yet found it necessary to set up oil-recovery systems. The cost of suitable oils for this process are in the range of $0.40 to $1.00 per gallon. The amount of oil retained depends upon five factors:

1) Mechanism used for oil removal
2) Construction of fabrics
3) Amount of pressure applied on the squeeze roll following the oil bath
4) Character and viscosity of the oil
5) Type of emulsifying agent employed

The consumption of oil on a 4-yard broadcloth is approximately one gallon of oil per 400 to 500 yards. Based on an average price of 50c per gallon, the cost of oil is ⅛c per yard. The chemical and dyestuff savings alone, even for light shades, more than offset the cost of oil; for heavy shades the process shows considerable savings. Many dyeings of different shades can be processed through the same oil bath with a saving in original oil cost. This simplifies the cleaning operation in changing from one color to another. If an oil has not been contaminated, it may be used over a wide range of shades with elimination of much oil changing.

VISCOSITY OF OILS—Oils of low viscosity are not retained in fabrics to the same degree as heavy oils, and they are easier to emulsify. Some constructions, such as corduroys, have a tendency to en-

Oil No	*Flashpoint °F*	*Viscosity at 100°F*	*Color*	*Odor*	*Maximum Stable Temp °F*	*Retention Percentage*
1	350	85	water-white	none	450	3.58
2	275-295	60	lt amber	slight	400	2.75
3	390	365	water-white	none	400	5.37
4	355	65-75	water-white	none	250-300	4.59
5	360	80-90	water-white	none	250-300	4.89
6	395	200	water-white	none	300	5.14
7	425	345	water-white	none	300	5.83

tran more oil than others and to give it up less readily. We suggest the use of lighter oils where oil retention is a problem. Extraction tests of many fabrics dyed by this process have showed an oil retention of ¼ to ½%. Such quantities are not undesirable from an end-use standpoint and they are not a drawback in the application of certain finishes.

STREAM POLLUTION

It has been called to our attention that stream pollution might be a problem in some areas. Although we have not yet set up any recovery systems, it could easily be accomplished by trapping the overflow of the first emulsifying unit. As the oil emulsions formed are not indefinitely stable, the water could be quickly settled from the oil and drawn off. Centrifuges could also be used in place of settling tanks.

PROCEDURE FOR DETERMINING OIL RETENTION

We have used the following simplified method *(1)* and have found it very satisfactory for determining the oil content of fabrics:

Weigh out a 10-gram sample on a centigram balance at room conditions. Dry a 100-ml beaker by placing it on a clean hot plate (low setting) for 3 to 4 minutes. Cool briefly and weigh on the centigram balance. Repeat the procedure until the weight is constant.

Place the sample in a 250-ml beaker. Add 50 ml of carbon tetrachloride carefully measured from a 50-ml graduate. Work the sample in the beaker for 3 to 4 minutes, forcing the solvent repeatedly through the sample with the base of the 50-ml graduate as a plunger.

Remove 25-ml of the solvent as follows:

Hold the beaker containing the sample and solvent in an inclined position over a 50-ml beaker. Press the sample firmly with the plunger until 25-ml or more of the solvent has drained off. Carefully measure 25 ml of the solvent with a 25-ml graduate and pour it into the previously weighed 100-ml beaker. Evaporate off the solvent at a low setting on a hot plate. Dry to constant weight by the same procedure as in weighing the empty beaker.

Calculate percent of oil from the gain in weight of the beaker multiplied by two.

The dyeings on exhibition were all taken from plant production dyed by the hot-oil process on standard ranges containing Williams Units. They carry identifying marks indicating the method by which they were dyed.

We have already run a large range of shades from pastels to deep tones on many cloth constructons, including the following:

twills	poplins	herringhones
drills	towelings	Oxfords
sheetings	sateens	print cloths
corduroys		

All vat, sulfur, and direct dyes are applicable by the hot-oil process, provided that they are not soluble in the oil. Development work is being carried out on other classes of dyes.

A few plant runs on rayons and various synthetic fabrics indicate that the hot-oil process will lend itself to the dyeing of many synthetic fabrics, although some synthetic fibers retain a higher percent of oil than does cotton. We have really not yet processed a sufficient yardage of synthetics to evaluate the merits of the hot-oil dyeing method properly for fibers other than cotton.

Especially wool has the tendency to absorb and retain a high percentage of oil. Experimental work is now being carried out on this fiber to determine if the process can be used on woolens, worsteds, and mixed fabrics.

LABORATORY WILLIAMS UNIT

Laboratory matches can be accurately developed and reproduced in plant practice by use of a laboratory Williams Unit. Formulas taken from the small machine to plant equipment check to a remarkable degree. Plants having a small laboratory unit can therefore save valuable production time by making use of the laboratory model for prematching shades. Application research in the dyeing of various classes of dyes on various fabrics can be carried out advantageously at a low cost on the laboratory unit without tying up plant men and equipment.

The laboratory Williams Unit has a 6½-gallon capacity, is equipped with a variable-speed drive and is designed to equal the performance of full-scale plant equipment. The padder of the laboratory unit has 3 rolls mounted directly on the framework. Like the new full-scale machine, the new laboratory unit has been designed to operate at a steam-jacket pressure of 50 pounds instead of 15.

CONCLUSION

Hot-oil continuous-dyeing methods have demonstrated their value in plant application. The use of hot oil in new, high-pressure Williams Units gives to the textile industry a wholly new approach to the problems of continuous dyeing. Proved advantages of the new method and equipment for dyeing include the following:

1) Excellently shaded lots.
2) True reflection of colors.
3) Savings in dyestuff consumption.
4) Savings in chemical consumption.
5) High-speed production.
6) Adaptability to short runs.
7) Ease of changing from one shade to another.
8) Better sewing qualities in fabrics.
9) More lustrous dyeings.
10) Versatility of the Williams Unit, as it may also be used for continuous dyeing in the water phase and for other textile operations, such as soaping, oxidizing, etc.
11) Use of temperatures above those normally employed.

REFERENCE

(1) NNE Section, "A Simplified Method for the Determination of the Oil Content of Textiles," *Am Dyestuff Reptr*, 40, P30 (1951).

DISCUSSION

Question: What is the effect of the high temperature of the oil bath on the fastness properties of various vat colors?

Answer: In all the dyeings we have tested we have seen no difference in the fastness of the vat colors. When I say fastness, I mean fastness to washing. In some cases some of the oil-dyed samples have shown somewhat better light fastness but not sufficiently better to state that the process of dyeing by the oil method produces better light fastness.

Q: Are you able to dye heavy shades with direct colors and at what temperature do you dye them?

A: We haven't done a lot of direct-color work, but I will say this, in the laboratory for the first time we were able to pad direct blacks and direct reds and dark browns. Comparison dyeings were made in the laboratory in the normal manner for forty-five minutes. When the hot-oil dyeings were compared with the comparison dyeings we found that the fastness properties were equal. But we have done only a limited amount of work so far with direct colors.

Q: What was the temperature?

A: We pad direct colors at the highest possible temperature and recommend a temperature near 250°F in the oil bath. But the dyeings I have just mentioned were run at 220°F.

Q: How much do you have to boil grey goods before application of sulfur dyes by the hot-oil process?

A: According to our experience with sulfur dyeing, the goods need no better preparation for dyeing by the hot-oil method than by the older methods. The important thing is that the padding be properly and evenly carried out before the goods enter the hot oil. Then excellent results can be obtained. Hot oil will not improve a bad padding job; it does set the sulfur dye more quickly, however, than the old methods.

Q: Have you tried using a hot-oil unit as an ager for printed goods?

A: We have, and we noticed that there was a leveling action that took place, or a movement of the color in the oil bath. We thought that, because the color was absolutely inert or insoluble in the oil, if we ran a print it would stay within its mark. However a smearing of the print in the oil bath takes place. Although this would be beneficial in dyeing, it is a problem that would have to be overcome

if we used an oil bath for aging, and we have that under investigation right now as those prints that we did develop, even though they were smeared, were developed in a time of about three seconds.

Q: I once had the opportunity to see hot-oil dyeing. Not attempting to be critical, I did notice some slubs which were dyed three times as heavily as the established shade of the rest of the fabric. Is there anything that could be done to overcome this difficulty?

A: The nubs were dyed heavier?

Q: They were more of a fuzz. At first glance I thought these were dye specks.

A: Maybe it was due to the character of that particular piece of goods. I have not observed such a phenomenon.

Q: Does the pressure on the pad influence the final shade to any degree, and do you have to adhere to a set pressure in padding?

A: We haven't found that pressures are a critical problem as long as material is properly and evenly padded.

Q: Is there any indication that a hot-oil bath might be used to apply dyestuff on such fibers as Orlon and Dacron?

A: There is certainly some indication from some laboratory work we have done that extremely high temperatures as high as 350 and 400 degrees may be desirable for these synthetic fibers. I believe there exists a possibility of developing some work along those lines.

Q: What type of color would you use?

A: We are working at the moment with vat dyestuffs.

Q: Are any fluorescent colors being dyed by this method?

A: We have run a few samples of fluorescent colors on a few acetate fabrics, but we have not been able to apply fluorescent colors on cotton by this process.

Q: Coming back to vat dyes, I wonder if there is any improvement in penetration on heavy goods by the hot-oil method in comparison with the ordinary method of dyeing?

A: We haven't actually noticed any improvement over material that had been properly dyed in the first place. I wouldn't say that there would be any improvement, but for certain particular shades the development of a color may not be obtained by other dyeing processes, whereas the hot-oil method always gives full color value.

Q: How about penetration?

A: Penetration depends entirely on the padding operation and not so much on the action in the hot oil.

Q: Have you experienced any difficulty in applying a water-repellent finish on fabrics dyed by the hot-oil process?

A: That question was raised on two or three lots, and I have some Oxfords in the exhibit that have been treated satisfactorily with durable water repellents. Both spray and hydrostatic tests were okay. I think the reason that the quarter or one-half per cent of oil left in the material does not interfere with the proper application of durable water repellent is that such a low amount of oil does not form a continuous film.

Q: How about Vat Blue B C S types; can you run them successfully?

A: We are running such blues successfully every day. There is one very heavy shade over there that was made with one pound of Vat Blue B C S Double Paste per gallon. The lighter shades in the exhibit dyed with this blue are also very satisfactory.

Q: May I ask again if you get as much color value from such a high concentration of blue by the hot-oil process as by dyeing the pigment-padded goods in a jig?

A: If the padded goods are properly developed in a jig, the color value would undoubtedly be as good as by the hot-oil process. We have not actually made many direct comparisons under controlled conditions. In some plants, however, it was found that they did experience a real saving in dyestuff by going over to the hot-oil process. This was probably due to the fact that it is easier by the latter method to maintain good control and always to produce full color value.

Q: Is there any accumulation of water in the oil bath on a long run?

A: That was one of the first things we worried about. But we have run a machine for two weeks steadily without noticing any accumulation of water in the oil. If the temperature is held high enough and the machine is well balanced at both pads, it seems that water is flashed into vapor and is carried out evenly. But if the temperature should drop below 214° F, water would very probably accumulate in the oil bath.

Q: I would like to ask for the benefit of foreign concerns that don't have such vast production as U S concerns, "Is the hot-oil method applicable to short runs?"

A: I think the process would lend itself to relatively small lots. I am not going to say you can dye ten yards of goods on a continuous machine or 250. I am not sure that I know what a lot of people mean by "small lots." I would say that, in any continuous machine, you certainly ought to have a lot of 2,000 to 5,000 yards before you consider putting it into a continuous range. By this process you can run small lots as economically as you can on any other basis because you still have the dye in the padder to consider. The change in the chemical unit is of little consequence from the viewpoint of cost. I don't know what they call a small run in Europe, but I imagine anything from 2,000 to 5,000 yards.

Q: That is right.

Q: How much oil does it take to charge a Williams Unit?

A: Normally we fill a unit a little better than half full. We put one barrel in a unit, or about fifty gallons, and leave enough space for an increase in volume to about 75 gallons, the full capacity of the unit.

Q: Is there much change in the oil in the course of a run?

A: In the majority of colors that we have run we have seen a slight tinting of the oil. We have a few vat colors where not the vat dyestuff itself but probably some colored impurities would bleed off into the oil. I have in mind a Navy Blue that would stain pink, and we have seen that pink discoloration take place in the oil bath, but that has not affected the final results of the dyeing. Normally an oil does not color to a marked degree, unless the dyestuff is soluble in oil.

Q: What is the oil content of the fabric when it comes out of the hot oil, on a percentage basis?

A: We have not attempted to take a sample at that point. All the samples have been taken off at the end of the range after the oil has been emulsified.

Q: Would you care to comment on the molten-metal process in comparison with the hot-oil process?

A: I have never dyed textiles by the molten-metal process, and until I have run both processes, I think I would not be competent to evaluate one process against the other.

Q: Do you have any information about fiber degradation?

A: We haven't seen any yet because the process is new. We are now running accelerated tests to determine whether or not we might get fiber degradation. Unless the oils would split themselves and produce some compounds that might produce fiber degradation, I don't believe the small amount of mineral oil left in the fabric would be harmful. Many of our textiles over many years, even our grey goods, have been sized, and the sizing compounds contain a small amount of mineral oil. Many of our finishes today, even sanforized finishes, contain a small amount of mineral oil, and I haven't heard of any complaints of degradation because of mineral oils left in the goods.

Q: Have you ever given thought to the use of oil-soluble dystuffs?

A: We have actually dissolved oil-soluble dyestuffs in hot oil and dyed them on cotton from a hot-oil bath. The results were not at all satisfactory.

Northern New England Section——

FACTORS AFFECTING THE SERVICE LIFE OF LEATHER IN WOOL PROCESSING*

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INTRODUCTION

IN THE formulation of a wool oil, one of the performance factors that must be considered is its effect on textile leather—belting and aprons—with which the oil comes in contact during processing. With certain types of oils, particularly those that have good scouring properties as a consequence of high or unique emulsifier content, this factor can be as important as such widely recognized properties as emulsion stability, light stability, scouring efficiency or corrosiveness of the oil. It is therefore important to understand the specific effect which the various components of a wool oil might have on the service life of leather.

In granting that composition can affect the service life of leather equipment, we are not assuming that it is the only factor involved, for admittedly the selection of leather, the type of tannage and stuffing and the care in processing also contribute to the ultimate wear and can account for marked variations which exist in leather quality. Other contributing factors arise from the processes adopted by the woolen mill itself and involve the quantity of oil employed, the degree of mixing or the use of other processing aids. However, the discussion presented here shall be limited to the first of these possibilities, that of the wool-oil composition.

Our interest and study of this phase of wool-oil formulation was the result, as one would suspect, of unsatisfactory mill performance which developed after the introduction of oils of maximum scouring efficiency. The program itself goes back more than ten years and thus predates, to a very considerable extent, the era of the so-called self-scouring wool oils which were introduced after the war. The problems of recent years, resulting from the widespread acceptance of these newer oils, have placed further emphasis on this problem and have prompted us to re-examine our earlier work. It is important that the woolen industry acquire a better understanding of the factors contributing to this phase of leather performance.

Robert M Koppenhoefer

The nature and amount of wool oil employed in processing wool are important in the effect of wool oil on the life of textile leather with which the wool stock comes in contact. The author has contrived a laboratory machine and an accelerated experimental procedure by which the effect of wool oils on leather can be studied with results closely paralleling those in mill practice. He explains how oils of different kinds behave toward leather and how excessive deteriorative effects on leather can be avoided.

EXPERIMENTAL METHODS

The problem was not easily reduced to a laboratory experimental basis, and yet the problems were such that any effort to solve them on full plant-scale equipment constituted an almost insurmountable obstacle. The best solution was reached through the construction of a condenser tape machine, shown in Figure 1, which was designed to handle conventional textile tapes, which rotated at mill speeds and tensions on rotating, grooved steel bars, each one inch in diameter. The belts were powered by a motor-driven steel drum. The tapes were installed as endless belts by means of lace clips so that the tapes were turned twice and flexed through 1200 degrees in making a complete circuit while moving at a rate of 250 feet per minute. Since the feeding of oiled wool stock would be impossible, wool oil was fed directly to tapes twice daily. Much of the early effort was concerned with establishing a satisfactory procedure, but eventually a technique was evolved that could be correlated with mill practice. Admittedly, the test is an accelerated one, for results are achieved in two weeks which would require 3 to 6 months in the mill. The important point is that the same type of deterioration is obtained, namely, hardness, transverse fissures and a splitting grain, and the appearance of spent tapes compares closely with mill-deteriorated tapes. Results are expressed in hours of operation to a complete break; although, in the early stages, a standard time of operation was used, and deterioration was measured by loss in tensile strength. The spent tapes are also analyzed for oil content, pH and degree of tannage. Sufficient results have been obtained to permit us to predict with reasonable accuracy the effect of an experimental oil on leather deterioration if the oil was to be used in actual mill operation.

LEATHER DETERIORATION —— Textile-leather-tape deterioration is usually manifested by loss of flexibility and development of excessive hardness. Transverse fissures develop, usually on the grain surface, and it can be accompanied by an actual splitting of the grain away from the corium. Either process is detrimental to such a degree that the tape is rendered useless in a relatively short

* Delivered on March 9, 1951 at the Massachusetts Institute of Technology, Cambridge, Mass.

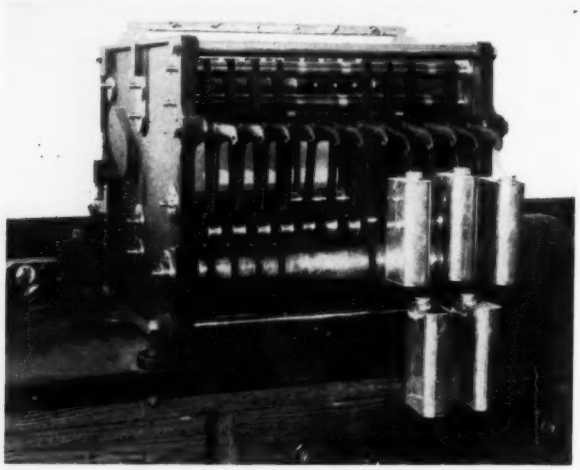

Figure 1
Laboratory Condenser Tape Machine

period. Thus a service life of 2 to 4 months is not unusual, whereas a year or longer is desirable. Deterioration could conceivably result from any of the following:

a) *High pH*—Vegetable belting is usually properly tanned in a pH range of 3 to 3.3. In use, where they are subjected to alkaline oils, the pH can rise to 4.5 and, in some instances, to as high as 7. Since the vegetable tanning process is reversible under alkaline conditions, the net effect can be a serious loss in degree of tannage, and the raw hide substance lacks the ability to remain pliable under successive wetting and drying cycles. Thus, high alkalinity is a factor in deterioration. We believe, however, that it mainly serves to aggravate a deteriorative condition brought on by other basic changes in tanning structure, which we will discuss later. While most prepared soluble oils have an alkalinity in the range of pH 8-9.5 and are potentially detrimental, they do not differ significantly from the old soda ash-red oil preparations, which were widely used in years past and which were comparable in pH range.

b) *Fillers and Abrasives*—Anything that tends to fill the interfibrillary space and prevents the free movement of the individual fibers in flexing can cause embrittlement and loss of service. In sole-leather manufacture, special precautions are exercised to remove such fillers as Epsom salts from the grain surface to eliminate cracky tendencies. Belting leather contains no such materials, but they can be introduced from excessively dirty stock or by transfer of fiber-conditioning agents, which are widely used today and which contribute to high ash values in used leather.

c) *Overtannage*—Tanners recognize that excessive deposition of tannin can render leather brittle so that any materials which can function as pseudo tanning agents could be detrimental in this manner. Sulfonated organic derivatives constitute a class of syntans used in the tanning industry, and sulfated fatty oils and sulfonated mineral oils must be considered as weak tanning agents since they combine, chemically, with the leather complex and are capable of precipitating gelatin from solution at favorable pH conditions, i e, on the acid side of the isoelectric point.

d) *Other Sources of Deterioration*—There are other sources of deterioration which are probably not involved in textile-mill operation. Oxidizable oils, excessive temperatures (particularly in the presence of wet leather), and high tensions or poor alignment of equipment are factors which we need only mention.

LEATHER LUBRICATION ——— In the manufacture of woolens, a lubricant is added early to facilitate processing, and it is subsequently removed as it serves no useful purpose in the finished article. Such is not the case with leather for the lubricant is essential in processing and it contributes substantially to the final feel or "life" of the leather. It must be remembered that histologically skin is an

TABLE I
ANALYSIS OF NEW AND DETERIORATED LEATHER TAPES

	Type of Tape	
	New	*Used*
Type of Oil in Service	None	Emulsified Mineral Oil
Tensile Strength, lbs per sq in	4680	..
Stretch at Break, %	26.0	..
Oil, %	31.3	24.7
pH of Leather	3.40	4.78
% Moisture	4.15	9.01
% Hide Substance	31.32	31.25
% Combined Tannin	26.45	28.97
% Water Solubles	6.72	12.38
% Ash	0.23	5.88
Degree of Tannage, %	84.5	92.50
Analysis of Extractables		
Acid No	73.0	31.4
Saponification No	169.0	66.2
Saponifiable Matter, %	77.3	37.4
Iodine No	56.0	50.0
Unsaponifiable Matter, %	21.9	61.9

TABLE II
EFFECT OF OIL COMPONENTS ON TAPE LIFE

	TYPE OF OIL				
	100-Sec Com Refined Mineral Oil	*100-Sec Highly Refined Mineral Oil*	*Lard Oil*	*Lard Oil + Soap*	*Lard Oil + Fatty Acid*
Conc Oleic Soap or Acid	..	..	..	20	20
Running Time, hours	>2500	>2500	2200	2210	>2500
Analysis of Final Tapes					
Oil, %	31.6	32.9	34.0	31.8	32.7
Acid No of Oil	7.1	8.2	11.3	50.8	32.7
Saponifiable Matter, %	8.7	10.0	97.3	98.9	..
pH of Leather	3.90	4.25	3.65	5.54	4.05

TABLE III

EFFECT OF SEVERAL EMULSIFIER TYPES ON TAPE LIFE

	TYPE OF EMULSIFIER			
	High Rosin Soap	*Sulfated Neatsfoot Oil*	*Sulfated Sperm Oil*	*Mineral Oil Sulfonate*
Analysis of Wool Oil				
Combined SO_3, %	0.0	1.8	1.8	1.8
Water, %	11.0	11.0	11.0	11.0
pH of 10% Emulsion	9.6	5.2	5.2	9.1
% Compounding	30	35	40	25
Running Time, hours	>830	447	547	423
Analysis of Final Tapes				
Oil, %	37.2	34.3	33.9	33.5
Acid No.	59.1	24.8	10.5	7.0
Saponifiable Matter, %	43.3	55.0	31.2	31.5
pH of Leather	4.05	4.09	4.10	4.12

intricate network of fibers. In processing, lubricant—oil or grease—is added for two purposes: The first is to form a film over the fiber surface so that, in drying, cementing action is not excessive. The second is to provide a boundary lubricant, which will permit the fibers to slip over each other when they are put under tension. It is this action which lends so much to the final tensile strength and, depending on the type of lubricant, to the final texture.

CHANGES DURING SERVICE——— One of the first approaches to the problem of rapid leather-tape deterioration was to analyze such tapes to ascertain what changes had taken place. In Table I, a comparison of a new tape with a typical used tape which has undergone rapid deterioration is presented. It is evident that, with this example, the tannage has not been reduced, although in other instances of rapid deterioration, where a high pH also developed, the degree of tannage has been reduced to as low as 16%. In such instances, a final pH of as high as 6.5 was obtained. It is also evident that the ash has increased to a high level. It is significant to note that the original grease or lubricant of the leather has been almost completely replaced by wool oil indicating that a severe washing action has taken place. Many such used tapes, as well as laboratory tapes from the condenser tape machine, have been examined, and they all show the same pattern with variations. But in this example, as with many others which were analyzed, there are no definite changes to account for the marked deterioration that was readily visible.

EFFECT OF COMPONENTS OF WOOL OIL———Because of the large number of chemical compounds used in the formulation of self-emulsifying wool oils, it would be a large assignment to attempt to study each one separately. Certain types of emulsifiers and oils were selected as typical of the classes of compounds likely to be encountered. Chief of these were fatty oils, mineral oils, fatty acids, soaps, sulfated fatty oils and sulfonated mineral oils. Such products were utilized in making typical wool-oil blends, and such blends were tested on a series of tapes on the condenser tape machine with results as tabulated in Tables II and III. Service life was determined from length of running time to break, and the experiment was halted after 2500 hours of operation.

In Table II there is further evidence which shows that, after this period of operation, the added oil has almost completely replaced the natural stuffing. Thus, the mineral-oil-treated tapes contained almost negligible quantities of saponifiable fat, while the lard-oil tapes contained less than 2% of unsaponifiable matter. The original tapes contained 20% of unsaponifiable and 80% of fatty components. It is further plainly evident that mineral oil is not deteriorative and does not differ from lard oil in this regard. Neither high free fatty acid content nor potassium oleate soaps are detrimental even though the latter markedly increased the pH of leather.

Table III covers the effect of several important emulsifier types on the service life of leather tapes. In the preparation of the soluble oils, the emulsifier content was leveled by adjustment of each to a 1.8% combined sulfur trioxide content, and the soap was equated, approximately, on a weight basis. These oils would probably possess excellent scouring properties as the emulsifier content is well in excess of what is required for simple dispersion. The varying pH's of oils are essential for obtaining a homogeneous blend with mineral oil. It should also be pointed out that these experiments were conducted at a much later period than those in Table II, and the use of other leather stock means that this variable has changed so that a direct comparison between rosin soaps and oleic acid soaps, as is evident in the two tables, may be misleading. Other work with rosin soaps has not shown them to differ significantly from oleic acid soap in their deteriorative action, so that the possibility of variation in the quality of the leather stock must be taken into account. Nonetheless, it is evident from the data in Table III, which are directly comparable, that organic sulfate or sulfonates are capable of accelerating the deterioration of leather. Since these types of products have been extensively and successfully employed for years by the leather industry, these results are hardly to be expected. However, as explained previously, these derivatives are capable of entering into chemical combination with leather complex, and we have attributed their action to a pseudo tanning or, more specifically, an overtannage, which will be elaborated on later. It is sufficient here to recall that other materials which are beneficial in tanning, such as the tannins themselves, can be detrimental if used improperly or in excess. Certainly the continued subjection of leather to these types of oils is not a normal condition. While both types of emulsifiers are deteriorative, mineral oil sulfonates are somewhat more severe, probably because of their greater affinity or combining power. It is important to point out that in this work, to accentuate the effects, we used emulsifier concentrations well in excess of what is found in practice. Nominal quantities of such emulsifiers can be used with quite satisfactory results as far as service life of tapes is concerned.

One would expect the deteriorative action to be directly related to the sulfonate content of the oil and to the extent of

TABLE IV

EFFECT OF OIL QUANTITY ON RATE OF DETERIORATION WITH MINERAL OIL SULFONATE TYPE OF OIL OF 1.8% COMBINED SO_3

Rate of Oiling, ml per day	0.5	1	2	4
Running Time, hours	279	228	185	149
Tensile Strength, lb per sq in	2320	1951	2150	2322
Oil Content, %	28.6	32.5	32.3	31.9
Acid Number	7.3	14.5	13.8	15.3
% Saponifiables	65.6	55.7	46.7	36.4
% Unsaponifiables	31.0	34.9	38.4	43.0
Combined Oil, %	0.39	0.45	0.87	1.25
pH of Leather	4.54	4.88	4.68	4.89

TABLE V
EFFECT OF pH OF OIL ON DETERIORATION
Sulfonate Type Emulsifier

pH of Oil	10.9	3.6
Analysis of Leather		
Tensile Strength, lb per sq in	3005	3460
Oil, %	33.2	33.2
pH of Leather	4.31	2.83
Unsaponifiable in Oil, %	59.8	60.4

application. This is shown in Table IV where deterioration was produced at an increasing rate with increasing rate of application. At the same time, the rate of washing of natural stuffing grease from the leather was increased. Reference has been made previously of the chemical combination of sulfonated oil with leather complex, and the combined oil, which can be determined chemically, is directly related to the rate of deterioration. In wool processing the rate of transfer of oil to wool must depend on the quantity of oil used. Furthermore, this rate of transfer is certainly not a direct function of oil content, but it must increase more rapidly with increasing oil content. Thus deterioration is more marked when large quantities of oil are employed.

Other factors relating to tape deterioration have been studied. Thus, in Table V, a direct comparison has been made of a deteriorative type of oil at two pH levels. The results do not indicate any marked improvement with an acid-type oil. Actually, the adjustment of soluble oils to an acid pH would be impractical on several counts: increased corrosion of metal, decreased emulsion stability and actual separation of the oil itself.

Other studies have included the effect of moisture and the benefits of using dressing oils. High moisture tends to accelerate deterioration, while proper dressing can alleviate but not eliminate deterioration.

CONCLUSIONS

An experimental procedure for determining the probable service life of leather tapes in wool processing has been described. It has been shown that process oil rapidly displaces natural grease from leather. Some oils can accelerate rate of deterioration because of a tanning-like action exhibited by fatty oil sulfates or mineral oil sulfonates, which are widely used as emulsifiers. Such deterioration can be controlled within practical limits by restricting the concentration of such components in a soluble oil to safe levels and by control of stock oiling to eliminate excesses.

Mid-West Section Outing Report

June 16, 1951
Lake Lawn Lodge, Delavan, Wisc

THE annual outing of the Mid-West Section was held at Lake Lawn Lodge, Delavan, Wisconsin, on June 16, 1951, and was attended by 145 members and guests.

In the morning a softball game, played between the salesmen and millmen, was won by the salesmen, 5 to 4.

After a buffet lunch most of the members and guests headed for the golf course. The nongolfers entered horseshoe pitching and ping-pong tournaments.

In the evening, following dinner, the participants in the day's activities were awarded trophies and prizes of many descriptions. George B Chabot, Jr, chairman of the Outing Committee, assisted by his committee members, awarded the many fine prizes made available through the generosity of many mill and supplier friends.

GOLF WINNERS

Millmen's Trophy (1st low gross millmen)—Ken Harms tied with Al Rathke, 81.

Salesmen's Trophy (1st low gross salesmen)—Frank Meyers tied with George Willgeroth, 80.

Members

Low net — 114-57-57 — B F Vaughan

Class A—

1st low net— 81-18-63—Ken Harms
2nd low net— 83-18-65—Art Patton

Class B—

1st low net— 96-33-63—Bill Boyd
2nd low net— 94-27-67—Don Brown

Class C—

1st low net— 99-39-60—P Willgeroth
2nd low net—105-42-63—Bernie Smith

Class D—

1st low net—119- 63-56—P Soderdahl
2nd low net—197-138-59—J Wasko

Guests

1st low gross—68—Marvin Stahl
1st low net—98-36-62—E T Gurry, Jr
(Peoria handicapping system)

HORSESHOES

Singles—B Isenogle
Doubles—Charlie Robbins-H Erickson.

PING-PONG

Vic Lawrence

All members of the Outing Committee headed by George B Chabot, Jr are to be congratulated.

Respectfully submitted,
JOHN E A SCHRODER,
Secretary.

Calendar of Future AATCC Meetings

COUNCIL: Oct 18 (Hotel Statler, N Y); Nov 16 (Hotel New Yorker); Jan 18, 1952; April 18, 1952; June 20, 1952; Sept 19, 1952 (all in New York); Nov 6, 1952 (Boston).

GENERAL RESEARCH COMMITTEE: (Same dates and sites as Council) plus Sept 28 (Swiss Chalet, Rochelle Park, N J).

NATIONAL CONVENTIONS: 1951—October 17-19, Hotel Statler, New York, N Y; 1952—November 6-8, Boston, Mass; 1953—Sept 17-19, Hotel Stevens, Chicago, Ill; 1954—Atlanta, Ga.

HUDSON-MOHAWK SECTION: Sept 21 (Jack's Restaurant, Albany); Oct 26 (Hotel Utica, Utica N Y); Dec. 7, Feb 1, 1952, Mar 21, 1952, May 2, 1952 (all at Jack's Restaurant); June 20, 1952 (Annual Outing).

MID-WEST SECTION: Sept 29 (Morrison Hotel, Chicago, Ill.)

NEW YORK SECTION: Sept 28 (Swiss Chalet, Rochelle Park, N J); Nov 30 (Swiss Chalet); Jan 11 (Hotel New Yorker); Feb 29 (Hotel McAlpin, New York); April 18 (Swiss Chalet); May 16 (Swiss Chalet); June 20 (Outing).

NORTHERN NEW ENGLAND SECTION: Oct 26 (LTI, Lowell, Mass); Nov 30 (Annual Meeting, Boston, Mass).

PACIFIC SOUTHWEST SECTION: Aug 3 (Nikabob Restaurant, Los Angeles, Cal); Oct 6 (Annual Outing, Ojai Valley Inn, Ojai, Cal); Jan 11, 1952; March 28, 1952.

PHILADELPHIA SECTION: Sept 14, Oct 26, Dec 7, Jan 18, 1952 (all at Kugler's Restaurant, Philadelphia).

PIEDMONT SECTION: Sept 22 (Annual Meeting, Charlotte, N C).

RHODE ISLAND SECTION: Oct 26 (Providence Engineering Society; Nov 16 (Johnston's).

SOUTH CENTRAL SECTION: August 24-25 (Outing); Dec 1 (Hotel Patten).

SOUTHEASTERN SECTION: Sept 8 (Columbus, Ga); Dec 8 (La Grange, Ga).

Philadelphia Section———

TRENDS IN THE CHEMICAL PROCESSING OF COTTON FABRICS*†

WALTER M SCOTT

Assistant Chief, Bureau of Agricultural and Industrial Chemistry, Washington D C

INTRODUCTION

The chemical processing of cotton fabrics is so ancient a business that its origin, like that of cotton itself, is lost in antiquity. Though called by other names and not recognized as involving chemistry when first used, some of the basic finishing techniques for cotton are certainly as old as the manufacture of cotton cloth. According to some authorities, that is more than 3,000 years. Others date the use of cotton back nearly 5,000 years.

HISTORICAL

EARLY DEVELOPMENTS———When the early weaver learned how to wash cloth and dry it over a bar, he became a finisher. He became a dyer when he first used colors obtained from herbs, minerals, woods, or decomposed liquors to improve the appearance of cloth. The first cotton fabrics may have been finished and dyed by such crude methods—or possibly by more advanced techniques. Certainly, a great deal was known about the use of natural dyes by the time cotton appeared to compete with silk and wool in ancient textile markets. Indeed, cotton cloth made as recently as 3,000 years ago could have been dyed in fast colors, for the use of mordants to fix colors in fabrics had been discovered about a thousand years earlier.

As the manufacture of cloth progressed, man learned many new tricks by which to produce better fabrics. He learned to press his cloth, and then to give it different finishes by varying the technique of pressing. He learned to weave goods with dyed yarns, then to paint-in stripes and figures, finally to hand-print goods.

Ancient weavers learned also that fabrics dye better if they are clean. In application of this knowledge, it was soon discovered that pieces of washed cloth gradually whitened if exposed for a time in sunlight and open air. Several washings and further exposure shortened the time of whitening. Thus, man learned to bleach. The washing was done first in streams, later in pools, and then in wooden tubs. Still later, a drying chamber in which cloth could be dried during the rainy seasons, was developed. Eventually man learned to cleanse, bleach, and dye fabrics by continuous methods and was well on the way to the development of modern finishing techniques.

Nevertheless, when cotton manufacture became a mechanical, rather than a hand, operation and moved from homes into factories about 150 years ago, chemical processing was still in its infancy. It was 1850, just 100 years ago, that John Mercer in England made the experiments leading to mercerization, one of the best known and widest used of all modern-day chemical-processing methods for cotton.

Walter M Scott

After an historical introduction of the finishing of fabrics, the author discusses the "golden age" of chemical processing in which modern chemistry is employed to modify the properties of fabrics, especially cotton; and the chemistry of such modification is briefly given. The processes taken up are those that have been worked upon by the Southern Regional Research Laboratory in New Orleans, including partial acetylation, carboxymethylation, phosphorylation, aminization, treatment with CMC and bleaching.

THE GOLDEN AGE———Since then chemical processing has moved steadily forward. About 1940 the industry appeared to put on seven-league boots. Efforts to meet war demands for chemically processed fabrics, coupled with the new interest in chemical fibers, led to phenomenal developments. In fact, the past decade has been what John D Williams, writing in *The Wall Street Journal* for June 22, 1950, called the "golden age" of chemical processing.

According to Mr Williams, the number of companies selling textile chemicals in the United States today is 136 compared with 44 in 1939. Production of textile chemicals by four large companies—Rohm & Haas, American Cyanamid, Warwick Chemical, and Monsanto—is up 1500 per cent over a decade ago.

Nobody knows exactly how many different textile finishing chemicals there are, but 712 trademarks are listed now against 82 in 1939. Chemicals that make fabrics repel water, moths, fire, mildew, sun-rot, wrinkles, stain and other things are available. At least six hundred firms apply them.

These figures refer, of course, to chemical treatments for all textiles. However, there is ample evidence that cotton gets its share. The large number of specially finished cottons on the market and the volume of research under way in government, university, cotton mill, and private laboratories are strong indications.

With competition for markets at an all-time high, cotton interests are taking the attitude that in chemistry lies a road to salvation. If chemical processing can create entirely new fibers, it can surely improve a natural fiber of inherently superior properties, they reason. Consequently, they are turning against man-made, synthetic, fibers the same weapon that has been used so successfully in capturing a

* Presented before the Meeting-in-Miniature of the Philadelphia Section in Philadelphia on October 28, 1950.

† A report of research, certain phases of which were conducted under the Research and Marketing Act.

sizable share of markets that once were indisputably cotton's.

EMPHASIS ON MODIFICATION—— Modern emphasis on the chemical processing of cotton goods is two-directional. Many cotton fabrics are given simple treatments which add chemicals to the surface to enhance existing properties. But much of the research on cotton today is exploring a more complex field—chemical modification by the reaction of chemicals with the cellulose of cotton.

Considered from the viewpoint of the organic chemist, cellulose is a natural long-chain high polymer made up of anhydro-glucose units. The formula is generally given as $(C_6H_{10}O_5)_x$.

In some ways the reactions of cellulose resemble those of the simple sugars, but since the anhydro-glucose units are linked through the 1-4 carbons the potential-reducing groups are not active. Cellulose then behaves as an aliphatic polyalcohol with two secondary hydroxyl groups on the 2 and 3 positions and a primary hydroxyl on the 6 position.

Generally, cotton is modified through reaction with the hydroxyl groups by either esterification or etherification. Such reactions have transformed cotton, both fiber and fabric, into entirely new materials from a chemical point of view. These new materials have their own characteristic properties, many of which cotton does not naturally possess.

Undoubtedly there is hope for cotton in this new approach to improving its usefulness. Already there are occasional comments on the high cost of developing and launching new synthetic fibers and suggestions that future research on existing fibers, both natural and synthetic, will prove more advantageous than the investigation of new fibers.

These may be minority viewpoints at the present time, indicating at best an eventual halt in the number of cotton's competitors. What is significant is that they are expressed at a time when cotton is being tailor-made to achieve new glamour and utility through chemical modification, and when there is definite assurance that further improvements in this and other fields of chemical processing can be made.

THE SOUTHERN REGIONAL RESEARCH LABORATORY——A review of all the recent developments would be too lengthy. It must be remembered that a number of laboratories are engaged in research on the chemical processing of cotton. Because I am most familiar with the work of the Southern Regional Research Laboratory in New Orleans, Louisiana, I have selected a few examples of developments there to illustrate the progress that is being made generally.

The Southern Regional Research Laboratory is one of the largest and best-equipped laboratories for cotton research in the world. It is a unit of the Bureau of Agricultural and Industrial Chemistry, and was established in 1938 for the specific purpose of finding new and improved uses for plentiful southern farm crops. Naturally, a large part of its work is on cotton from fundamental research on the fiber through every stage of spinning, weaving, and finishing.

The Laboratory's chemical-processing investigations are wide in scope, including studies of bleaching, mercerization, and dyeing as well as the development of improved chemical treatments on both a laboratory and a pilot plant scale. Some of these treatments are the additive type, while others involve chemical modification. Because developments in the latter category are newer, I shall describe a few of these first.

PARTIAL ACETYLATION——No better example of the application of chemistry to improve cotton can be cited than the development of a modified fabric resistant to mildew, rot, and heat. To obtain such a product acetic anhydride is made to react with the cotton cellulose, changing it partly to cellulose acetate, a new compound with different properties. The process is called partial acetylation.

Cotton material rot-proofed by partial acetylation has several advantages over material rot-proofed in other ways. The treatment causes no discoloration, unpleasant odor, or stickiness, and it is not toxic. Successful use of partial acetylation to prolong the useful life of bags for holding the chemicals in home water-softening systems, as well as of sand bags used during the war, is an old story. This treatment also has been applied successfully to fishing nets and twines, greatly prolonging their usefulness. The rot-resistant qualities of partially acetylated cotton now are being tested in soil soakers, the cloth tubes used to irrigate gardens and lawns.

Lately acetylated cotton cloth has been successfully used as the material for laundry press covers and pads. Ordinary covers usually wear out within a week because of charring as a result of the intense heat to which they must be subjected. In experimental use at commercial laundries, treated cotton covers were still good after three to four weeks. If partially acetylated covers were used until completely worn out, they would last probably five to six times as long as untreated covers.

Partially acetylated napped flannel used in press pads has performed the same way, outlasting ordinary cotton flannel pads several times over. Acetylated cotton lasts longer on home ironing boards, too, because untreated cotton chars at a lower temperature and loses strength much faster.

CARBOXYMETHYLATION——Another process of chemical modification which has shown a distinct promise for cotton is partial carboxymethylation, accomplished by the introduction of carboxymethyl groups into the cellulose. Cotton fabrics can be impregnated with chloroacetic acid, then treated with an alkali metal hydroxide, such as sodium hydroxide, to have approximately one carboxymethyl group per 10 to 25 glucose units. These fabrics are swellable and absorb about 20 per cent more water than untreated cotton fabrics.

Subsequently such cloth may be treated with a solution of a salt of a metal, such as copper or mercury, which produces a nonsoluble metal salt of the carboxymethyl groups on the textile. This latter treatment renders the fabric rot-resistant. Further modifications of partially carboxymethylated products also are possible.

SOLUBLE COTTON——One of the most promising developments to emerge from the research on partial carboxymethylation is a new water-soluble cotton yarn with potential use in a number of industries. This yarn is made by direct etherification of cotton yarns with monochloroacetic acid to obtain a partially carboxymethylated material. A substitution of approximately one carboxymethyl group per 2 to 3 glucose anhydride units is obtained. The yarn retains the strength of the original cotton yarn, although, of course, the grams-per-denier is reduced because of the added weight of the substituent groups. The soluble yarn also retains most of its original characteristics except that it is now soluble in water.

The sodium on the carboxymethyl group may be replaced by a number of other metals or basic substances to change the yarn further. For example, a long-chain amine gives a product which is not soluble in water, but is readily disintegrated by alkaline solutions.

Cotton yarns that dissolve in water or in weakly alkaline solutions should find uses similar to those of the alginate fibers now being produced in England from alginic acid, a constituent of seaweed. Alginate fibers have been found suitable for use as a spacing agent to provide the so-called "missing threads" in specially woven fabrics. They are particularly useful in making openwork or sheer fabrics, fine handkerchiefs, unusual scarves or dress materials, and various types of decorative goods. They serve especially well as the connecting yarn in a process by

which socks are knitted continuously, then separated by washing. Soluble fibers also are used as supporting threads for fine worsted yarns in making light-weight wool fabrics that could not otherwise be woven. They provide certain advantages also in the weaving of mohair and other textiles. Numerous uses outside the textile field have been suggested.

Another soluble fiber developed during the study of partial carboxymethylation at the Southern Regional Research Laboratory should also be mentioned. This man-made fiber was spun by forcing a solution of sodium carboxymethyl cellulose into a bath containing the salt of a metal, such as lead, copper, or aluminum. It dissolves in soapy water and the potential uses generally are similar to those of the soluble cotton yarn, but they are not as extensive. Aside from greater versatili y, the soluble cotton fiber when dry has twice the strength of the dry metal-salt fiber, and the process for production is less complicated.

COTTON FABRICS FOR ION-EXCHANGE———Despite their importance, soluble yarns and fibers are, to some extent, a digression in this paper. Let us return to the general subject of improving cotton *fabrics* through chemical modification.

The Southern Regional Research Laboratory recently has found that several chemical treatments give cotton fabrics varying degrees and types of ion-exchange ability. Ion exchange, usually accomplished by the use of granular resins, is an essential step in many purification processes. The purification of water is a familiar example. Others include the purification of antibiotics, of chemical solutions and dispersions, of gases, and of the like. Fabrics appear especially advantageous in certain laboratory ion-exchange processes because of the ease with which they may be manipulated. For example, modified cotton fabrics have been used successfully in producing peanut protein of exceptional purity at the Southern Laboratory.

The potential usefulness of cotton fabrics in the field of ion exchange is enhanced by the fact that either anion- or cation-exchange abilities may be obtained, depending on the treatment applied. The partially carboxy-methylated fabrics mentioned earlier have cation-exchange abilities. So do phosphorylated cotton fabrics, made by the action of phosphoric acid and urea on the cellulose of cotton, and partially etherified cotton, produced by treatment with 2-chlorethylsulfonic acid and sodium hydroxide. Aminized cotton, produced by the action of 2-aminoethylsulfuric acid and sodium hydroxide, is an anion exchanger.

Progress has been made toward increasing the capacities of these fabrics to compare favorably with those of the commercial ion-exchange resins. For example, aminized cotton fabrics originally having an exchange capacity of 550 milliequivalents per kilogram were given a capacity of about 2500 by exposure to the vapor of ethylenimine. The capacity for commercial exchangers used to remove acid impurities is only about 3000. Work toward further improvement is under way. Also, a start has been made toward determining the exact effectiveness that can be expected of each type of fabric.

While the field of ion exchange offers definite possibilities for expanding the use of cotton, even more important is the fact that fabrics with ion-exchange properties contain reactive groups, which may serve as points of attachment for further modifying the cellulose in the cotton. In fact, modified cotton fabrics for ion-exchange use grew out of research started for other purposes.

AMINIZATION IMPROVES DYEING———The process of aminization, for example, was developed during investigations to improve techniques for introducing amino groups into cellulose to improve the dyeing characteristics of cotton. Although cotton fabrics are available in a variety of colors, all dyes cannot be satisfactorily applied to the fiber in its natural form. The absence of basic nitrogen groups in cellulose prevents ordinary cotton from taking wool dyes, which produce desirable effects not usually obtainable. In contrast, the chemically modified, aminized, fabrics produced at the Southern Laboratory can be dyed in warm, rich colors with a number of wool dyes. Also, some typical cotton dyes produce darker shades and are faster to laundering than when applied to untreated fabrics.

Aminized cotton fabrics, like those treated by partial carboxymethylation, may be further modified to obtain other new qualities needed for specific cotton uses. In particular, the introduction of the amino group permits the addition to cellulose of organic groups which give water repellency and rot resistance.

INSECT PROOFING———In addition to these examples of chemical-modification research at the Southern Regional Research Laboratory, let me cite a couple of the investigations now under way which illustrate new opportunities for cotton fabrics through additive finishing.

In a study of insect proofing, conducted in co-operation with the Bureau of Entomology and Plant Quarantine, a method of protecting cotton flour and feed bags from insect penetration by treatment with a mixture of pyrethrins and piperonyl butoxide has been developed. Recent tests by several large bag manufacturers confirmed the value of pyrethrins for this purpose and showed that application is practical from a textile standpoint. After three months of storage, however, the piperonyl butoxide, used as a synergist in the formulation, had migrated into flour stored in the bags. New chemicals reported to be superior activators of the pyrethrins and that may be less likely to leave the cloth are now being tested.

The importance of this type of chemical processing can be illustrated by a few figures on the use of cotton for bags. Before World War II bags were cotton's third largest customer, ranking after tire cord and shirts. For a time during the war, when more than a billion yards of cotton fabric a year were used in bags, they were the number-one outlet for cotton. In 1945, after war needs began tapering off, bags were the end use for 938 million yards of cotton cloth. In 1950 they are expected to account for possibly 850 to 900 million yards. In terms of cotton, that is roughly half a million bales. Feedstuffs, flour, and other milled cereal products are the most important products packed in cotton bags.

IMPROVING SOIL RESISTANCE———The other example of research on additive finishing that I want to bring to your attention is a treatment to improve the soil resistance of cotton fabrics. This treatment was developed at the Institute of Textile Technology in Charlottesville, Virginia, under a contract financed by funds from the Research and Marketing Act, and supervised by the Southern Regional Research Laboratory.

The process consists of adding a small amount of carboxymethyl cellulose, commonly known as CMC, to the final rinse water when fabrics are washed. CMC is a low-cost cellulose derivative, which already has a variety of industrial applications, including use in detergents and in the finishing of cotton textiles. It is readily available in wholesale quantities, and will soon be supplied in small packages convenient for home use. When CMC is applied as a rinse and dried, it appears to coat cotton fibers with a smooth film, which keeps dirt from coming in close contact with the fabric. Thus the fabric soils less readily and dirt is easier to remove on subsequent washing.

About three level tablespoons of CMC per gallon of rinse water—enough to make a 0.25-percent solution—gives the cloth improved soil resistance without changing the feel of the fabric. About four times this amount—enough to make a 1-percent solution—makes the fabric slightly stiffer, like starched material, when dried.

In the experiments at Charlottesville, test samples of cotton fabrics were first rinsed in CMC solution, then dried, and uniformerly soiled with carbon black. These washed easily to their original whiteness. Untreated fabric similarly soiled could not be washed cleaner than a dull,dirty gray. Cotton fabrics rinsed in a 1-percent solution of CMC proved three or four times as resistant to soiling as did untreated fabrics.

Similar, though less striking, results were obtained with other treatments, such as carboxymethyl starch and water-soluble forms of methyl cellulose. The investigators reported, however, that ordinary starch and other materials normally used on cotton fabrics have relatively little effect on soil removal.

BLEACHING SURVEY———To conclude this review of new trends in the chemical processing of cotton fabrics, let me tell you about an unusual study of bleaching methods, which has contributed to the rapid progress made in continuous bleaching recently. This study provided practical information on the changes brought about in fabrics during the bleaching process, and led to the development of new and improved methods for the evaluation and control of different bleaching operations. One of these is a method for the determination of water absorption, which is now in use by a number of commercial bleaching plants.

In making this study the Southern Regional Research Laboratory analyzed the chemical and physical properties of fabrics bleached by a number of different methods to determine the effect of the bleaching. In all, eleven methods in use at four commercial bleaching plants were studied. Samples of a selected cotton cloth were mixed with large commercial lots of fabric ready for bleaching at these plants. Small samples were withdrawn at the most important steps of each bleaching process for tests to show the progress made in purification. At the end of each process the samples were again tested to determine the final quality.

The processes studied represented three general methods of bleaching: the caustic-soda kier boil and hypochlorite bleach; the caustic-soda kier boil and peroxide kier bleach; and the continuous processes using hydrogen peroxide or chlorite. The study revealed certain disadvantages in all three methods, although each produced commercially acceptable cloth. Differences not visible or detectable by the usual control laboratory were observed.

The caustic-soda kier boil and hypochlorite bleach yielded fabrics with lower amounts of residual impurities and with higher cellulose contents than did the continuous processes. Fabrics bleached by the continuous processes, however, showed slightly lower amounts of residual impurities and slightly higher cellulose contents than those from the caustic-soda kier boil and hydrogen peroxide kier bleach.

When measured by fabric changes, that is, by breaking strengths, thicknesses, weights, and fluidities, the caustic-soda kier boil and peroxide kier bleach showed slightly better results than the continuous process using hydrogen peroxide; and both of these gave better results than the caustic-soda kier boil and hypochlorite bleach.

Measurements of reflectance, or whiteness, and also measurements of the amount of liquid taken up, revealed no differences for the three classes of bleaching methods.

Since this survey was completed and the results were published in 1947, chemical companies and bleachers have obtained and applied additional information as a basis for improving the continuous processes. As a result, bleaching methods today are in step with other procedures for the chemical processing of cotton fabrics. They are modern and progressive, looking toward continued improvement in the quality of cotton goods.

CONCLUSION

The chemical processing of cotton fabrics has made great strides in recent years because textile men and chemical companies have co-operated in putting the results of chemical-processing research into practice to meet recognized needs. Still greater progress is to be expected in the future, particularly in reactions with cellulose to produce new types of cotton fabrics. Building on information that has been collecting for centuries, the modern finisher is well equipped to give cotton its greatest opportunities in this, the "golden age" of chemical processing.

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• PATENT DIGEST •

PAUL WENGRAF

FLAMEPROOFING AND COLORING FABRICS in One Operation; Oil-in-Water Emulsions. G, 2, 03

U S Pat 2,536,978
(American Cyanamid—Fordemwalt—Jan 2, 1951)

Dyeing and flameproofing have hitherto been effected in two separate steps requiring expensive and complicated operations. Combining of both procedures was not possible because of the incompatibility of the necessary treating agents.

The present patent suggests the use of oil-in-water emulsions containing the coloring as well as the flameproofing ingredients. The coloring component requires some sort of binder to bring about sufficient adhesion of the pigment to the fiber, examples of which are oil-modified alkyd-resins or alkylated amino resins, such as a butylated melamine-formaldehyde condensate or both components combined. Any solid, finely-divided color pigment regardless of its constitution can be used. The flameproofing agent should be, preferably, a chlorinated hydrocarbon, such as a highly chlorinated paraffin; however, inorganic agents, such as phosphates, antimony trioxide or the like can also be applied as in standard flameproofing procedures.

Example: An oil-in-water emulsion is prepared by suspending methylcellulose in hot water, cooling and stirring while adding ammonia. In this emulsion a blend of chlorinated paraffin (40-45% Cl— content), which is dissolved in a hydrocarbon solvent, and antimony trioxide is stirred. Some linseed fatty acids are also added to form ammonia soap, this mixture being stirred until a smooth paste results. A pigmented mix consisting of Cr_2O_3, modified alkyd resin, and alkylated urea-formaldehyde dissolved in xylene-butanol to form the oily phase of the emulsion is added and homogenized with the aqueous phase. The contents indicated are: 16% chlorinated paraffin, 61% Sb_2O_3 and 9.1% chromium oxide pigment. The coated fabrics, after drying, are said to exhibit uniform color and high flame resistance.

Among other references cited by the Patent Office:

U S Pat 2,326,233 (1943—Leatherman): fireproofing compositions comprising organic solvent solutions of chlorinated paraffins, zinc carbonate as a pigment, plasticizers and fillers.

EXPEDITED PATENT SERVICE

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U S Pat 2,178,625 (1939—Hooper & Sons): flameproofing by impregnating with a water soluble fire retardant, drying and coating with a dispersion containing chlorinated paraffin and a colored pigment.

U S Pat 2,089,697 (1937—General Electric): a flame resistant cellulosic material is obtained by impregnating with a mixture of phosphoric acid and urea.

INDIGOSOL PRINTING PASTES —Basic Pyrazolones Added. D, 2, 04

U S Pat 2,540,799
(General Aniline & Film Corp—Taras—Feb 6, 1951)

Indigosols, i e, the sulfuric acid esters of leuco vat-dyes, generally are sufficiently soluble in aqueous printing pastes. There are Indigosols of certain vat dyestuffs, however, such as those of the Pyranthrone series, that are made soluble with more difficulty, thereby making it technically impossible to use them for printing purposes. Despite the great number of useful assistants available for dispersing Indigosols, it has been found that none of them have a substantial effect in solubilizing the forementioned dyestuff groups.

It is claimed that this problem has been solved by adding pyrazolone, e g, antipyrine, amino antipyrine or diamino antipyrine, to the Indigosol paste. Acid-reacting pyrazolones obtained by the introduction of acid groups into the pyrazolone nucleus are excluded.

Example: A mixture of 100 p of an indigosolized Acridone vat dye is ground with 26 p antipyrine and 6% sodium sulfate. This is incorporated into a printing paste, which is printed and developed according to the standard Indigosol printing method. Strong and level prints are reportedly obtained.

Among other references cited by the Patent Office:

U S Pat 2,432,041 (1947—Durand & Huguenin): Indigosol dyestuff preparations containing a water soluble acid amide, generally urea, and a quaternary ammonium compound (cf *Am Dyestuff Reptr* 37, 246, 1948).

U S Pat 2,431,708 (1947—Durand & Huguenin), suggests the use of sulfobetaines of quaternary compounds, e g, N-benzyl pyridinium sulfobetaine (cf *Am Dyestuff Reptr* 37, 246, 1948).

FLUORESCENT RESINS — Condensates of Ketones, Aldehydes and Guanidine Derivatives. G, 2, 04

U S Pat 2,541,184
(Sun Chemical Corp—Ackerman—Feb 15, 1951)

As is well known, resin condensates are used for various finishing operations, especially for shrink- or crease-proofing. Combining these effects with the property of fluorescence might well be desirable and new uses could be found in the field of decorative arts or dresswear as pointed out in the preamble to this specification. Organic dyes or organic pigments are said to generally lack fastness to light while fixing inorganic pigments with a binder causes undesired stiffness of the fabrics.

The inventor observes that aldehydes, ketones and guanidine- or cyanoguanidine salts condensed under alkaline or almost neutral conditions form clear colorless oils with a slight yellowish fluorescence in ordinary day light, but a bright fluorescence under excitation by light rays in the ultraviolet range. Many examples for preparing resin solutions of this type are offered: e g, 60 p guanidine carbonate are added to a mixture of 75 p acetone and 246 p formaldehyde (37%) at about 50° C. The pH of 8 has to be reduced to 7 after the reaction by adding 30 p phosphoric acid; the condensate is then heated to the boil for 30 minutes. The resulting resin, fluorescent with a strong blue-green color under ultraviolet light, is water miscible and can be separated by adding methanol to the solution. Upon prolonged heating, however, increased polymerization sets in and the resin becomes gradually less soluble. Condensing merely under alkaline conditions *without subsequent neutralization* results in the formation of water insoluble gels.

The resinous materials protected by the

present patent are compatible with other resins in the dispersed or dissolved state, which are currently used to give pleasant shrinkproofing effects on textiles. Moreover, a more attractive appearance may be imparted to any dyed fabric by the fluorescent quality of the material aside from the properties of shrink- or crease-proofness obtained. This effect is said to be durable in contrast to many other optical bleaching or finishing operations.

References cited by the Patent Office:

U S Pat 2,364,900 (1944—Ellis Foster): hardenable resins obtained by condensing melamine or other nitrogenous bases with formaldehyde and acetone.

U S Pat 2,325,376 (1943—General Electric): heat-hardenable resins formed by reacting urea or another amino base under alkaline conditions with formaldehyde and a keto ester, such as ethyl aceto acetate, $CH_3COCH_2COOC_2H_5$.

U S Pat 2,323,898 (1943—General Electric): condensing urea under alkaline conditions with formaldehyde and halogenated acetone (chloroacetone).

U S Pat 2,257,239 (1941—General Aniline): aftertreating fabrics dyed with direct dyestuffs, e g, Benzo Fast Scarlet 4 BS, with a condensate of an ammonium salt, formaldehyde and acetone.

Condensates of amino bases, formaldehyde and acetone have been described previously but apparently the fluorescent effect of these products, obtained under specific reaction conditions, has hitherto not been observed.

PIGMENT DYEING DISPERSIONS—Alkyl Cellulose, Thermosetting Resins, Elastomers.

C, 4, 07

U S Pat 2,543,718
(Interchemical Corp—Cassel, Clifford—Feb 27, 1951)

An earlier patent application by the same inventors, of which the present patent is a continuation-in-part, covers a pigment dyeing process characterized by the application of water-soluble, heat-precipitable alkyl celluloses combined with thermosetting precondensates. (A similar method has further been protected by U S Pat 2,515,170, cf *Am Dyestuff Reptr 40,* 6, 1951).

It has been observed that this method of using heat-precipitable alkylcellulose involves some difficulties in practice. The dyebath has to contain a substantial amount of the alkyl- (preferably methyl-) cellulose to prevent migration of the pigment in dyeing procedure. The minimum quantity is given as 0.25-0.5% of the dye bath. Moreover, the precipitation of the alkylcellulose requires special heating equipment since a passage over the customary steam-heated cans is generally insufficient; finally severe curing conditions are necessary for fixing the thermosetting component of this composition.

These difficulties are said to be at least partially avoided. The amount of alkylcellulose can be reduced according to the present modified method by incorporating a water-insoluble film-forming elastomer in the pigmented dyebath. "Elastomers" (defined by Fisher in *Ind Eng Chem,* 1939, pages 942 and 944) used in this case may be of natural rubber latex or dispersions of polymerized unsaturated hydrocarbons generally applied in producing rubber. Examples are butadiene, styrene, or acrylonitrile copolymers, rubber-like acrylic esters in general, etc. It has been found that the smaller the average particle size, the less elastomer necessary for fixation. The greater part of these particles should be of 0.5 micron or less in diameter. The presence of the elastomer dispersion permits control of migration and flocculation of the pigment. Fixation of the pigment is satisfactory after a passage over drying cans. Thus, vat- or azocolors can be developed by steam- or acid-steam operation and prior to the curing of the thermosetting resin. This effect may be considered a special advantage of the patented process.

Example: the padding dye liquid contains 0.5% of a water insoluble, film-forming elastomer (50% ethylacrylate polymer, "Rhoplex ER"), 0.08% heat precipitable methylcellulose, 0.4% thermosetting resin (a polyalcohol etherified melamine-formaldehyde resin) and 0.1% of a pigment (e g, a water-extendible dispersion of Sulfanthrene Pink, C I 1211) in an aqueous dispersion.

Among other references cited by the Patent Office:

U S Pat 2,394,542 (1946—Interchemical Corp): synthetic rubbers obtained by copolymerizing butadiene and acrylontrile, used as a base for pigment printing.

U S Pat 2,374,603 (1945—American Cyanamid): preparing pigment emulsion prints of the water-in-oil type, using as solvents in the oily phase nonaromatic (i e, aliphatic or alicyclic) compounds, preferably petroleum oil fractions.

U S Pat 2,275,991 (1942—Rohm & Haas): pigment prints obtained by dispersing in water a mixture of the pigment and a resinous material, especially acrylate or methacrylate polymers blended with a thickening agent—particularly gum or sodium alginate.

U S Pat 2,270,180 (1942—Dow Chemical Co): insolubilizing water-soluble cellulose ethers by adding glycol modified urea-formaldehyde solutions to obtain durable finishes, coatings or filaments.

RESIST-LIKE TWO-TONE EFFECTS—Obtained by Preprinting Water Soluble Thickeners.

D, 2, 02

Canadian Pat 469,312
(Jos Bancroft & Sons—Milne, Tokarz—Nov 14, 1950)

A water soluble thickening agent, such as British gum, gum Arabic or tragacanth, is printed on cloth and then immediately passed in wet state through a dyestuff solution on the pad, jig or in a beck, the thickener carrying sufficient water to saturate the fibers. The nonprinted areas therefore absorb more dyestuff from the bath than the printed portions.

The water content of the printing paste must not be so high that spreading of the design over the outlines can occur. The inventors claim that a simple method has been found to effect resist printing and dyeing in one continuous operation without intermediate drying or fixing the resist, which of course is not stable but will be removed during the dyeing procedure.

The specification states that the two-tone effect obtained in this process results by physical rather than by chemical means.

It may be added that this effect is probably due partly to local water adsorption and saturation of the cloth and partly to a mechanical protecting effect of the thickener. (Cf descriptions of the gelatin-tragacanth resists under Indigosol dyeings, e g, Durand & Huguenin's German P 636, 995).

THE ANNUAL
INDEX TO THE
PATENT DIGEST
JULY-1950
TO
JUNE-1951
WILL APPEAR
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NEWS

• Mount Hope Celebrates 50th Anniversary

Mount Hope Finishing Company, North Dighton, Massachusetts, celebrated its 50th anniversary on June 13th with appropriate ceremonies at its plant. Approximately 700 guests were present including prominent executives, converters, buyers, publication representatives and others. The Mount Hope Special of the New York, New Haven and Hartford Railroad left New York the night before to bring 250 guests from New York. The plant was in full operation during the morning and the guests were conducted on a tour of the premises following the cloth from the greige to the finished product.

During the tour, considerable interest was focused on Mount Hope's two nationally advertised finishes—Wat-a-set and Wat-a-set Elite. A huge display followed the path of the cloth to the finished product and displayed end-use garments. A 3,000 foot conveyor system is credited with saving 48 hours in shipping cloth due to elimination of traffic blocks in the finished goods warehouse.

The plant occupies 28 acres and has a capacity of approximately 2,500,000 yards of cloth per week. Highlighted during the tour was Orlon dyeing in a pad-steam unit at the rate of 32 yards per minute. Other highlights were a monorail elevator which lifts goods from the finishing room to inspection and packing areas, warehouse space estimated to contain at present 8,500,000 yards of goods, a 300-foot continuous bleaching range, the 2,100 kilowatt per hour electric plant operated by nine boilers, the water supply of 10,000,000 gallons drawn daily from the Three Mile River and the plant's own driven wells, and the company's own fleet of 15-ton trailer trucks.

After completion of the tours, the plant shut down at noon to allow the employees and numerous North Dighton residents to join in the festivities. About 1500 guests and employees were served an outdoor clambake.

Congressman Joseph Martin was toastmaster at the formal exercises following the clambake. He paid high tribute to Joseph K Milliken, president and treasurer of Mount Hope, for his contribution to New England and its industrial strength during a half century. The Congressman presented Mr Milliken with a testimonial scroll signed by 150 friends of long standing. Others who paid tribute to Mr Milliken were L G Kalmbach, president of Massachusetts Mutual Life Insurance Co, William T Read, former president of Morse Twist Drill Co and Bernard Semel, former impartial chairman of the Shirt Institute. Gordon Miller, president of Machinists' National Bank of Taunton, presented a gift to Mr Milliken in recognition of his long service on the board. Tim Manning presented a brass placque to Mr Milliken and Charles R Briggs, one of Mount Hope's oldest employees, presented a silver serving set from the employees.

Mount Hope Finishing Company was organized on June 13, 1901 with Joseph F Knowles as president and Joseph K Milliken as treasurer. They, along with William Crapo and Thomas Hathaway, constituted the company's directors. Ground was broken June 25, 1901 for the plant, a small brick building to house the gray room, singe room, bleach house, drying cans, and dyehouse. Other buildings already standing on the property were repaired. In December the first goods were processed, delivered and billed. Production capacity of the plant was estimated at 150,000 to 200,000 yards weekly and personnel at 75 persons. Motive power was provided by an engine with the assistance of two water wheels. A supply of gas was arranged and, after negotiation, the problem of water supply was solved by an agreement with the city of Taunton. Steady development of Mount Hope Finishing Company during fifty years from a hopeful venture far off the beaten path to one of the most successful corporations of its kind in the country, with a staff of approximately 1000, was impressively summarized for anniversary guests.

Guides escort guests through a tour of Mount Hope Finishing Company's North Dighton, Mass plan as part of the company's 50th Anniversary Celebration Ceremonies.

Congressmen Joseph Martin presents Mount Hope President Joseph K Milliken with a tribute signed by 150 long-time friends of the company and citing 50 years of service.

COMING EVENTS

AMERICAN ASSOCIATION OF TEXTILE TECHNOLOGISTS

Meetings: September 12, October 3, November 7, December 5 (Builders Club, New York).

AMERICAN CHEMICAL SOCIETY

Meetings: September 3-7 (New York, N Y).

AMERICAN OIL CHEMISTS' SOCIETY

Fall Meeting: October 8-10 (Edgewater Beach Hotel, Chicago, Ill).

AMERICAN SOCIETY FOR TESTING MATERIALS

Spring Meeting and Committee Week, March 3-7, 1952, Cleveland, Ohio.

Annual Meeting, June 23-27, 1952, New York, N. Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).

FIBER SOCIETY

Meetings: September 13-14 (Swampscott, Mass.); April 16-17, 1952 (Clemson House, Clemson, S. C.)

NATIONAL ASSOCIATION OF COTTON MANUFACTURERS

97th Annual Meeting: September 13-14 (New Ocean House, Swampscott, Mass).

NATIONAL ASSOCIATION OF TEXTILE MACHINERY MANUFACTURERS

Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantic City, N. J.

NEW YORK BOARD OF TRADE

26th Annual Dinner of the Drug, Chemical and Allied Trades: March 6, 1952.

SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES

Luncheon Meetings—Hotel Commodore (September 12, October 10, November 14).

Annual Meeting and Dinner—Hotel Commodore (December 11).

TEXTILE RESEARCH INSTITUTE

Annual Meeting, Nov. 8-9.

• SOCMA Holds Annual Outing

The Annual Spring Outing of the Synthetic Organic Chemical Manufacturers Association was held jointly with the Manufacturing Chemists Association at The Greenbrier in White Sulphur Springs, West Virginia, on June 14 to 16. The regular monthly meeting of the Board of Governors of the Association was held on June 14 at 11 a m and was followed by a joint luncheon with the Board of Directors of the MCA. Those attending through SOCMA were invited to the annual meeting of MCA which was held on the afternoon of the 14th. William M Rand, retiring chairman of the Board of Directors of MCA, discussed the defense program from the standpoint of the chemical industry and its problems and Manly Fleischmann, administrator of the National Production Authority, considered the program's aims and status from the government point of view. Sidney C Moody, president of SOCMA, discussed the international situation.

A joint dinner was held on the evening of the 14th and the speaker was David Lawrence, editor of *U S News & World Report*. There followed a showing of a color sound film produced under the direction of Edgar M Queeny, chairman of the Board of Monsanto Chemical Co.

On Friday, June 15th, about 235 participated in an all day golf tournament during which both the Old White and Greenbrier courses were played. Low gross winners on the Greenbrier course were R F Evans of Diamond Alkali Co and John L Crist, Jr, of Southern Dyestuff Corp, both with 74. C W French, Jr, of Pfister Chemical Works, had low gross on the Old White course with a 79. Nearest the pin on the 17th hole of Greenbrier was Neil B Conley of American Cyanamid Company (39") and Ralph Wechsler of Nopco Chemical Co was nearest the 18th of the Old White (36". Kickers handicap winners on Greenbrier were: Carl E Van Winckel of Carwin Company, Roy R Bunsted of Verona Chemical Co, G W Russell of American Cyanamid Company, Joseph Fistere of Mallinckrodt Chemical Works, James W Lindley of Dye Specialties Corp, George O Lindberg of Belle Chemical Co and J V S auf of Solvay Process Division of Allied Chemical & Dye Corp. Handicap winners on the Old White were: R L Hockley of Davison Chemical Corp, Robert S Mueller of Davison Chemical Corp, Harold Hilton of Ciba Company, H Archibald Bonyun of Publicker Industries, Inc, Gerald S Furman of A Maschmeijer, Jr, Inc, V C Irvine of Shell Chemical Corp, Leo B Grant of Dow Chemical Co and Fred Baumann of Interchemical Corp.

There was no organized activity on the 16th.

• Russell, Franklyn Acquire Poughkeepsie Firm

Charles F Russell, president of Metrotex, Inc, Elizabeth, N J, has announced his further acquisition, together with his partner, Henry J Franklyn of the Price Fire and Water Proofing Company, 43 Union St, Poughkeepsie, N Y. The transaction is intended to supplement the work carried out in Elizabeth along the lines of cuprammonium finishing, alkali and acid resisting finishing, and the production of fire-, water-, weather-, and mildew-resistant finishes.

Mr Russell stated that the 27 employes of the Poughkeepsie firm will be retained and the business expanded.

Emil L Johnson, secretary and general manager of Price Fire and Waterproofing Co, and general manager since 1932, will serve in the future as a textile consultant to the new company. His offices will be in New York. Catherine Owens, formerly assistant treasurer, will continue with the new organization as office manager; Charles J Connor will remain as factory superintendent.

Price Fire and Water Proofing began operations in 1904 under the late William B Price. Metrotex began operations in 1948 as a successor to the Willisden Proof Company of London when Messrs Russell and Franklyn became partners.

• Laboratories Given Priorities Assistance by NPA

With the issuance of Order M-71, on June 26, the National Production Authority provided a self-certification system to enable laboratories to obtain controlled materials and other products needed to carry on research projects. Provision also is made for giving assistance on a quarterly basis if requirements are for amounts greater than those permitted by the order.

Information relative to the order may be obtained at Department of Commerce field offices.

• Chemstrand Plans New Nylon Plant

A new plant for the production of nylon yarn at the rate of about 50,000,000 pounds per year will be built by the Chemstrand Corp, Philadelphia, Pa, near Pensacola, Fla, according to Osborne Bezanson, president.

Chemstrand became the first licensed nylon producer in the United States when Mr Bezanson signed an agreement with E I duPont de Nemours & Co, Inc, Wilmington, Del, recently.

The new plant will be constructed on the Escambia River, about 12 miles north of downtown Pensacola. Construction is expected to start in a few months. When completed, the new plant will employ 3,000 to 4,000 people.

Chemstrand is jointly owned by the American Viscose Corp, Philadelphia and the Monsanto Chemical Co, St Louis.

• Koppers to Boost Resorcinol Production

The Koppers Company, Inc has started improvements and additions to its Petrolia, Pa plant to increase its production of resorcinol from 4,500,000 pounds to 6,000,000 pounds annually, according to Dan M Rugg, vice president and general manager of the Chemical Division.

Mr Rugg has disclosed that the work has been requested by the Chemical Division of the NPA. Resorcinol is now under government allocation and the entire production of the plant will, for the present, be subject to distribution by NPA.

Efforts are aimed at getting the added facilities into production by November.

• Fire at Main Quaker Plant Fails to Seriously Impair Production

Though a rather severe fire loss was sustained at the main plant of Quaker Chemical Company's Conshohocken plant recently, resultant damage was confined to one building. The warehouses, external storage tanks (both above and below ground), the main factory building, the research laboratories, boiler houses and office buildings were left intact. Within 48 hours emergency steam and electric work was installed and Quaker attained production approaching that which prevailed before the fire by means of three shift operations.

Original plans for expansion of facilities that were laid out prior to the fire have been modified, however.

Approximately three and a half acres of ground have been purchased by the company on the Christiana River and the Reading Railway at Third and Heald Streets, Wilmington, Delaware. This property has six buildings on it presently, in addition to a boiler house, and has been used for the manufacture of special chemicals. Tankage, piping and electrical facilities are installed on the premises. However, some reconstruction and installation of new equipment will be necessary before the Wilmington plant can be put into complete operation as an independent manufacturing unit, it is reported.

Ultimately, Quaker reportedly hopes to turn out about 35 per cent of its production at Wilmington. The main offices, laboratories and factory will remain in Conshohocken where further expansion is planned as evidenced by the acquisition of another piece of ground adjacent to the present property and by the building of a new pilot plant unit, a new large warehouse, and other buildings.

An interior view of the Suntone Colors Laboratory, Warwick Chemical Company Division, Sun Chemical Corporation.

• New Warwick Laboratory

The opening of the new Suntone Colors Laboratory of the Warwick Chemical Division has been announced by Ernest Nathan, president of the Sun Chemical Corporation. The new laboratory is adjacent to Sun Chemical's Long Island City building and reportedly will be devoted exclusively to problems of color chemistry relating to decorative printing of textiles and plastics.

The new, modern facilities centralize a number of heretofore separately located laboratories. Products developed and controlled by this laboratory are presently being manufactured in Warwick plants in Rhode Island, New Jersey and South Carolina.

• National Aniline Moves Chicago Warehouse Facilities

The Chicago warehouse facilities of the National Aniline Division, Allied Chemical & Dye Corporation, previously located at 357 West Erie Street, have been moved to larger quarters at 3355 West 48th Place, in the Central Manufacturing Kedize Development. This new $150,000 warehouse on 63,100 square feet of land is directly served by the Chicago Junction Railway, it is announced. Ample parking space is provided.

• Cadgene Machinery Changes Organizational Structure

The partnership of J H G Cadgene and W Brundage, which has heretofore traded as the Cadgene Machinery Company in Paterson, N J, was dissolved on July 1. A new corporation, The Cadgene Machinery Company, Inc has emerged with the following officers:

President, Jacques Cadgene.

Vice-Presidents, Walter Brundage, Oswald Saldarini.

Treasurer-Secretary, Helmut Koppel.

• Victory Operations Begun

A new plant producing embossed and laminated Vinylite plastic film and sheeting was placed in operation by Victory Plastics & Embossing Corp at Harvey, Ill, on July 1. With printing equipment to be placed in operation soon, the plant will reportedly turn out a diversified line of printed, embossed, and laminated Vinylite plastic film and sheeting. It is situated close to the Bakelite Company plant at Ottawa, Ill, which supplies Vinylite plastic materials.

Vinylite plastic film and sheeting ranging in thickness from .004 to .020 of an inch, chiefly in 54-inch widths, will be processed in the 12,500 square foot plant, according to reports. Plans are said to be already in progress for further expansion of facilities and equipment as demand increases.

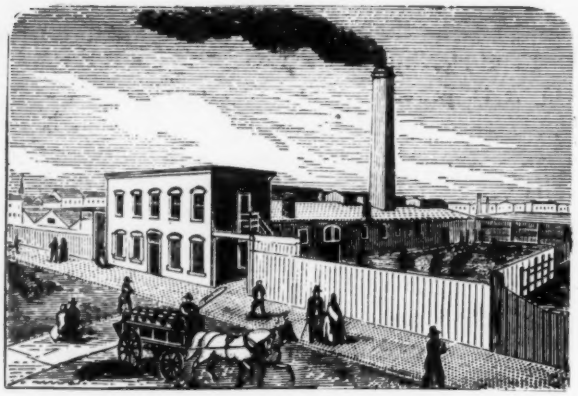
The plant will be operated under the supervision of Donald A Stolzenbach, formerly with Hotpoint, Inc. Sales in the Midwest will continue to be handled by E E Raymond in Chicago and George H Curtis Co in St Louis.

A B Boyd Company has been named West Coast representative.

• ADC Relocates Boston Office

The American Dyewood Company has discontinued its Boston Office and located the new office and warehouse on Riverside Avenue, Danvers, Mass.

Henry Hansen, who has been associated with the company for over 25 years, has been named manager of the Danvers office. George Stevens, formerly manager of the Boston office asked that he be relieved of the responsibility of running the new office. He will continue to call on all former customers, however, and will devote his time exclusively to sales work throughout New England.



First Silicate Factory in Philadelphia Under the Name of the Philadelphia Quartz Company

Newest PQC Research Laboratories at Primos, Pa

• Philadelphia Quartz Celebrating 120th Anniversary

July marks the 120th anniversary of continuous business of the Philadelphia Quartz Company, Philadelphia, Pa. It was July 21, 1831 when Joseph Elkinton opened the doors of his soap and candle enterprise in Philadelphia. He had recently returned from service for the Society of Friends as a teacher in the Tunessassa Indian School of New York. Although he had trained as a silversmith, that trade did not appeal to him, but the production of soaps definitely did. The business grew, so that by the time the founder's sons, Joseph S and Thomas finished their schooling, they took an active interest in the enterprise.

Thomas Elkinton's leaning toward technology directed his attention to silicate of soda leading to the purchase in 1858 of equipment to experiment with the product. The use of silicate of soda in the Elkinton soaps showed a distinct advantage for increasing washing action. Silicate sales to other soap makers were inconspicuous until the war between the states brought an embargo on southern rosin to the north. Soap makers became interested to substitute silicate for rosin. The new soaps found favor with consumers, and so silicate of soda became an established product. Soaps and candles still were manufactured in the Elkinton factory although with the introduction of the kerosene lamp, candle sales were waning.

The increased acceptance of silicate as a soap-making ingredient soon required greater production. In 1864 a large factory was built at 9th & Mifflin Streets, Philadelphia, and the present firm name came into use. Again in 1889, business growth justified expansion to the West, with a silicate factory in Anderson, Indiana. At the beginning of the present century, the acceptance of the corrugated paper box box as a shipping container, resulted in utilizing silicate's adhesiveness. A new plant was opened in Chester, Pa, devoted exclusively to manufacturing silicates of soda. At that time, the Philadelphia factory was closed and soap making discontinued.

Through the company's research, series of chemicals were produced by varying the proportions of the ingredients of silicate of soda which led to a variety of useful applications. From the original use of the product in soaps, the list of industries now using silicate of soda is long.

Besides the Anderson and Chester units, plants today are located at Baltimore, Md; Buffalo, N Y; Jeffersonville, Ind; Kansas City, Kansas; Rahway, N J; St Louis, Mo, and Utica, Ill. A subsidiary, Philadelphia Quartz Company of California, operates three plants—Berkeley, Los Angeles, California, and Tacoma, Washington. Another subsidiary is the National Silicate Limited, Toronto, Ontario, Canada. Thomas W Elkinton, great grandson of the founder, is president of the Eastern and Canadian companies, and a director of the California company. The present directors of Philadelphia Quartz Company are J P Elkinton, J G Vail, T W Elkinton, W Martin, J A Norton, C L Baker, A W Elkinton, E A Russell and J C Russell.

• Dyers and Finishers Meet With NYQMPA Officials

Members of the Dyers and Finishers Division of the Quartermaster Association's Textile and Knitted Goods Industrial Group met on June 26th with officials of the New York Quartermaster Procurement Agency to discuss developments and research projects in finishing. Brig Gen H L Peckham, Commanding NYQMPA, presided.

NYQMPA staff members described the role of dyers and finishers in military procurement and industrial mobilization planning. Discussion centered on problems relating to the supply of mildew inhibitors and subjects relating to procurement, such as specifications, allocations, DO ratings, financial assistance, and ceiling prices and controls.

Among the industry leaders attending were: John A Simmons, Lanett Bleachery and Dye Works; John Bancroft, Jr, Joseph Bancroft & Sons Co; R W Smith, The Aspinook Corporation; N H Friedman, The Harodite Finishing Co, Inc; T A Adams, United States Finishing Co; Weldon A Helmus, Fair Lawn Finishing Co; Reuben Messer, Antipyros Co; and R Morschner, Morschner Dye Works.

The meeting followed the NYQMPA's observance of their 176th anniversary by ten days. Chapters of the Quartermaster Association, a civilian organization composed of active, reserve, and former officers of the Corps, and businessmen and industrialists interested in its mission, held Anniversary meetings in a score of cities throughout the country last month.

• Naugatuck Expands Paracril Plant

Naugatuck Chemical Division, United States Rubber Company, announced on June 26 a major expansion program, aimed at doubling the production of its Baton Rouge, La, Paracril synthetic rubber plant.

Plans call for the construction of a new administration building, a laboratory, and a gate house as well as new reactors, drying units and other production equipment. New warehousing and latex storage facilities will also be added.

The expansion program reportedly will bring plant capacity for the production of Paracril nitrile rubber, Nitrex latex, high styrene latex and high styrene resins to approximately 30,000,000 pounds annually. Plans call for completion by early 1952.

• Fall Dyestuff Shortages Possible

Members of the Dye Industry Advisory Committee recently informed the National Production Authority, U S Department of Commerce, that a shortage of some types of dyes for civilian use may develop this Fall unless the industry gets more raw materials.

A spokesman said the industry has been able to meet increasing defense needs thus far without disrupting the civilian supply largely because the civilian demand has been slack. This slackness developed, he pointed out, because of generally overstocked inventories in many textile goods. Predictions seem to indicate, however, that the surpluses will be depleted by Fall, thus necessitating an accelerated production of textiles, which will require the use of more dyes.

The production of dyes for civilian work-clothing would be hardest hit because this type of clothing requires substantially the same dyes as those used in military clothing, it was pointed out, defense needs having required a high percentage of the total production of these dyes in recent months.

Other industry spokesmen said also that an increase in the production of dyes is limited because of the shortage of materials, such as sulfuric acid, phthalic anhydrides and parachlorphenol. They suggested that NPA survey civilian dye requirements and make allocations of sufficient materials to meet essential needs.

NPA said defense requirements are principally for these colors: Brown G, Brown R, Khaki 2G, Olive Green B, Olive R and Olive T. Defense demands have absorbed a heavy share of the total production of these dyes, using more than 80 percent of Olive R, Olive T and Khaki.

NPA advised the committee that a shortage of steel may cause a limitation on the use of steel drums in which dyes are shipped. An order now being considered would require that most dry dyes be shipped in other types of containers. Because of the possibility of a drum shortage, NPA urged the dye producers to make every effort to encourage their customers to return drums for re-use.

• U S Production and Sales of Dyes Substantially Increased in 1950

Recently-released preliminary statistics on United States production and sales of dyes in 1950 reveal that the total output was 202,000,000 pounds, an increase of 45% over the 139,000,000 lbs produced in 1949. Sales in 1950 amounted to 187,000,000 pounds, valued at $190,000,000, an increase of 37% in quantity and 33% in value over 1949.

The statistics are included in the eighth report of a series showing preliminary statistics on production and sales of synthetic organic chemicals. Individual dyes are grouped by Colour Index and Foreign Prototype numbers as well by chemical class and class of application. Copies of the section on dyes may be obtained by writing to the U S Tariff Commission, Washington 25, D C. The preliminary statistics are more than 95% complete. The complete statistics will be given in the Commission's final report, to be issued later.

The production of dyes grouped by Colour Index number was 146 million pounds in 1950 compared with an output of 100 million pounds in 1949, an increase of 46 percent; the production of dyes grouped by Foreign Prototype number was 33 million pounds in 1950 compared with 21 million pounds in 1949, an increase of 57 percent; and the production of ungrouped dyes was 23 million pounds in 1950 compared with 18 million in the preceding year, an increase of 28 percent.

Four chemical classes of dyes accounted for 8.5 percent of the total output of all dyes in 1950. These were: Azo dyes, which accounted for 36 percent of the total; anthraquinone vat dyes, 21 percent; indigoid dyes, 16 percent; and sulfur dyes, 12 percent. The output of each of the four chemical classes was greater in 1950 than in 1949. The increases ranged between 28 percent for the azo dyes and 79 percent for the indigoid dyes.

By class of application, the output in 1950 of vat dyes (75 million pounds) accounted for 37 percent of the total production of all dyes; direct dyes (41 million pounds) accounted for 20 percent; and acid dyes (21 million pounds) accounted for 10 percent.

For ungrouped dyes arranged by chemical class, which are included in the preceding paragraph, azo dyes were far the most important, accounting in 1950 for 61 percent of the total output of ungrouped dyes. For ungrouped dyes arranged by class of application, acetate rayon dyes accounted in 1950 for 28 percent of the total output of ungrouped dyes, direct dyes accounted for 23 percent, and vat dyes accounted for 21 percent.

Among the individual dyes produced in large volume were synthetic indigo, production of which totaled 26.2 million pounds in 1950 compared with 13.4 million pounds in 1949; sulfur black, 13.5 million pounds compared with 9.4 million pounds in 1949; direct black EW (C I 581), 8.2 million pounds compared with 6.4 million pounds; and anthraquinone vat jade green (C I 1101), 6.8 million pounds compared with 5.3 million pounds.

The output of azoic dyes and their components totaled 8.3 million pounds in 1950, or 12 percent more than the 7.4 million pounds produced in 1949. The output of rapidogens was 1.9 million pounds in 1950 compared with 1.7 million pounds in 1949, and the output of Naphthol AS and derivatives was 2.8 million pounds in 1950 compared with 2.5 million in 1949. Production of fast color bases in 1950 increased 54 percent over the 750,000 pounds reported for 1949.

• Increased Aero Cyanuric Chloride Production

Aero cyanuric chloride is now in greatly increased commercial production at the new Warners, New Jersey, plant of American Cyanamid Company, according to an announcement by the Synthetic Organic Chemicals Department. Cyanamid formerly produced cyanuric chloride, principally for dyestuff manufacturers, in a pilot plant at Warners. In April, 1951, production started in the first unit of the new plant, and a second unit, now going into operation, will reportedly enable Cyanamid to supply all present demands.

ACC suggests that present and future shortages of many coal tar intermediates, such as resorcinal, now being felt by dyestuff manufacturers, may be lessened by this raw material offering them a reliable source of supply. Since only a small part of the dyestuff molecule is represented by cyanuric chloride, the costs of brighteners produced from this intermediate are lower than those from other material, the manufacturer states.

A colorless, crystalline solid, cyanuric chloride is said to be easily hydrolyzed by water, but stable in the anhydrous state. It is reported to be easily soluble in acetic acid, ether, heptane and acetonitrile, but sparingly soluble in benzene, acetone, chloroform and nitrobenzene. Below 10°C, the compound is reported to be almost insoluble in water; above this temperature, hydrolysis is rapid.

• L & N Transfers Houston Office

The Houston office of Leeds & Northrup Company, Philadelphia, has been moved to 2480 Times Boulevard, Houston 5, Texas, from its former location, 1314 Texas Avenue. The new office is said to provide 50 per cent more space, and afford better facilities for supplying engineering information and service to the area from New Orleans to the California line.

• 8th Report, Bangor Employees Retirement Plan

The eighth year contribution by Bangor Mills, Inc, Pen Argyl and Bangor, Pa, to their noncontributory Employees Retirement Plan has been revealed by George H Korn, vice president of the firm. Total contributions to June 15 amounted to $228,710.00.

The plan is an insured guaranteed plan underwritten by the Occidental Life Insurance Company of California and is serviced by Charles H Weiss, Pension Consultant, with the American Pension Co of New York.

The Irving Trust Company is Trustee in charge of all pension policies and funds contributed.

On June 15, 15 employees were added to the list of participants. 36 of the present participants received additional pension policies to provide increased benefits due to increases in basic compensation.

Members of the Pension Committee are: Albert J McMasters, Office Manager; Ellisworth M Davies, Finishing Department Superintendent; J Lawrence Davis, Attorney; Meyer H Korn, President; and Charles H Weiss, Pension Consultant.

• SRRL to Serve Puerto Rico

Puerto Rico has been included in the agricultural area served by the Bureau of Agricultural and Industrial Chemistry's Southern Regional Research Laboratory in New Orleans, according to Dr C H Fisher, director. The Secretary of Agriculture has approved a proposal for the addition which was concurred in by the directors of Southern State Experiment Stations during their New Orleans meeting in March.

This is the second increase in the Southern Laboratory's region this year, Dr Fisher added.

• Smith Drum Names Southern Sales Agent

Smith Drum & Company, Philadelphia, Pa, has appointed the newly-organized firm of Parrott & Ballentine, 610 South Carolina National Bank Bldg, Greenville, S C as their sales agent for the Southern States. Both Perry M Farrott and Joe M Ballentine have been connected with Smith Drum in sales for a number of years. They will represent Smith Drum for their complete line of equipment, including hosiery dyeing machines, hosiery conveyor dryers, skein dyeing equipment, package and beam dyeing machines, centrifugal and pressure extractors, cabinet and port dryers.

• Dyeing Project Advisory Committee Meets

The Research Advisory Committee for the Dyeing Project of the Textile Research Institute met on June 18, 1951 at the Institute Laboratories in Princeton, New Jersey to discuss the research work done on the project during the last six months.

Members of the Committee present and their guests were:

J A Woodruff, American Viscose Corporation; W W Bayley, Sidney Blumenthal & Company, Inc; R W Canavan, Sidney Blumenthal & Company, Inc; J B Neely, Burlington Mills Corporation; W H Hindle, Burlington Mills Corporation; B B Allen, Celanese Corporation of America; R W Work, Celanese Corporation of America; E W Lawrence, Cranston Print Works Company; E A Murray, Deering Milliken Research Trust; J F Laucius, E I du Pont de Nemours & Company, Inc; (J H Trepagnier, E I du Pont de Nemours & Company, Inc; F S Allmuth, E I du Pont de Nemours & Company, Inc; F V Traut, Globe Dye Works Company; K T Schaefer, North American Rayon Corporation; H D Evans, Pepperell Manufacturing Company, Inc; E W Rhael, Sandoz Chemical Works, Inc.

The group was addressed by Dr J H Dillon, Director of the Institute, and Dr H J White, Jr who is directly in charge of the dyeing research. Dr White emphasized that the data on the uptake of alkali halides by hair seemed to indicate that the mode of interaction of the fiber with the salt was the same for all of the salts studied thus far.

It was also announced that Hans Schott has joined the Institute Staff and will work on the Dyeing Project.

• Roxbury Establishes Branch in Granby

Roxbury Chemical Co, Ltd, a division of the Atlantic Chemical Co, Inc of Centredale, R I, has opened a Canadian branch in Granby, Quebec "to provide better service for their Canadian customers".

Joseph Buonanno and Hugh Bonino, Atlantic officials, state that the new Canadian facilities will mean faster deliveries direct from local warehouse stock. Further, they point out that the Granby office will enable Roxbury to do business and accept payment for goods in Canadian dollars.

Eventually Messrs Buonanno and Bonino plan to erect a complete manufacturing plan in Canada for the sole purpose of producing chemicals for the Canadian textile, paper and leather industries, it is reported.

• Solvay Expands Chlorine and Nitrogen Facilities

The Solvay Process Division, Allied Chemical & Dye Corporation, announced on July 2 that it will shortly commence construction of a new mercury cell chlorine-caustic soda unit at its plant near Syracuse, New York. The new plant reportedly will involve an expenditure in the order of $10,000,000 and will about double capacity of Solvay's chlorine-producing facilities at Syracuse. It is estimated that 18 months to two years may be required to complete the project.

Solvay produces chlorine at its Baton Rouge, Louisiana; Huntsville, Alabama; and Hopewell, Virginia, plants as well as at Syracuse. The Hopewell, Virginia, plant uses salt and nitric acid as raw materials with sodium nitrate as a co-product and nitrosyl chloride as a by-product. At Solvay's other plants, chlorine and caustic soda are produced by electrolysis of salt brine. Just recently Solvay announced a $2,000,000 expansion of its Hopewell, Virginia, chlorine plant, in which a new chemical process developed by Solvay research will be employed. Under this process the nitrosyl chloride produced as a by-product in the existing chlorine plant at that location will be reacted with oxygen to produce chlorine and nitrogen tetroxide. The latter product will then be used to make additional nitric acid.

Plans to expand synthetic nitrogen capacity by 100,000 tons per year, together with conversion to natural gas from coke as a source of hydrogen, at a total cost of over $25,000,000, were also recently announced. The expansion will take place during the next two years at their Hopewell, Virginia, and South Point, Ohio, nitrogen plants.

Since 1946, the aggregate annual capacity of the Hopewell and South Point plants reportedly has been expanded by 80,000 tons of nitrogen.

• AOCS Program Committee

C E Morris of Armour and Company will be chairman of the Chicago meeting of the American Oil Chemists' Society to be held October 8-10 at the Edgewater Beach Hotel. Assisting him will be the following committee:

H T Spannuth, Wilson and Company, chairman; G J Stockman, Wurster and Sanger, Inc, engineering and processing; E W Colt, Armour Soap Works, soap and detergents; H C Black, Swift & Co, drying oils; K F Mattill, Swift & Co, nutrition.

Assisting Dr Black will be Francis Scofield, National Paint, Varnish, and Lacquer Association, Washington, D C.

• World Chemical Conclave Program Set

The American Chemical Society, in celebrating its Diamond Jubilee, will stage a World Chemical Conclave in New York and Washington in September. Officials have estimated an attendance of over 16,500 foreign and U S people in the chemical profession.

Morning and afternoon technical sessions of the ACS, Sept 3-7, and the International Congress of Pure and Allied Chemistry, Sept 10-13, will be held at the Statler and nearby hotels in New York. General lectures will be held every afternoon at Manhattan Center from the 10th through the 13th, under the auspices of the ICPAC. The Council of the International Union will reconvene in Washington for the 14-15.

The program will begin on Labor Day afternoon in New York with the commemoration of the ACS' founding in 1876. A plaque will be dedicated in Washington Square at the site of the first ACS meeting. In the evening, Gov Alfred E Driscoll of New Jersey and Dr N Howell Furman, ACS president, will speak at Manhattan Center, in conjunction with the presentation of the Priestley Medal to Dr E J Crane.

The first sheet of special issue ACS Diamond Jubilee U S postage stamps will be put on sale on the steps of the New York Post Office on May 4 with appropriate ceremonies.

8000 are expected to attend the afternoon ceremonial on the 5th at the 71st Regiment Armory where James B Conant of Harvard, honorary president of the International Congress of Pure and Allied Chemistry, will speak.

The President of the United States has been asked to address the Diamond Jubilee Banquet in the Waldorf Grand Ball Room, at which the achievements of chemists and chemical engineers for the past 75 years will be reviewed.

The story of world chemistry will be unfolded at the international functions and meetings, beginning with a reception for the International Union on September 8 at the Metropolitan Museum of Art. A reception for the International Congress is set for the 9th at the American Museum of Natural History. World scientists will celebrate the 50th anniversary of the U S National Bureau of Standards at the Union Banquet in Washington on the 14th.

• Rayon Yarn Company Established in Venezuela

Celanese Venezolana, a new rayon yarn company organized principally by the Celanese Corporation of America in cooperation with Venezuelan textile interests, has been established in Venezuela, according to an announcement made in Caracas by George H Richards, vice-president of the Celanese Corporation of America.

Capital for the new company was oversubscribed, with nearly all Venezuelan users of rayon yarns participating as shareholders, Mr Richards reports. Construction of the new plant will begin shortly, with necessary equipment being shipped from the United States under special license permitting export of the restricted items required.

The company may enter production of viscose yarn and staple in Venezuela if local demand justifies, and the production of industrial chemicals from petroleum, similar to those produced by the Celanese Corporation in its Texas chemical operations, is foreseen. Offices of the new company are in Caracas with Clifford Doolittle, Celanese Corporation, as general manager.

Directors of the new company include Harold Blancke, Roland O Gilbert, George H Richards and George Schneider, all of the Celanese Corporation of America; and Celso Serna, Rafael Szmurak and Leon Taurel, of Banco de Venezuela.

Venezuelan chemists and engineers, who are to be trained in the Celanese Corporation's U S plants, reportedly will be employed by the new company and occupy key positions following their training.

• LTI Offers Fashion Design Subjects

Lowell Textile Institute will offer in September a series of fashion design subjects in conjunction with its already existing structural textile design course, according to President Martin J Lydon.

The newly augmented course will be under the supervision of Professor Vittoria Rosatto, Head of the Institute's Design and Weaving Department, and reportedly is the result of a wide demand for a course that will embody the artistic applications in the field of fashions.

To such subjects as textile fabric analysis, cotton manufacturing, woolen and worsted manufacturing, power weaving, finishing, dyeing, and testing will be added drawing, costume design, costume illustration, rendition of texture, history of fashion, and other allied studies in an effort to provide a knowledge in both the building of fabrics and the application of these fabrics in the fashion field.

A one-week summer course in Fabric Identification, also under Prof Rosatto's supervision, was completed on June 29. Instruction in the course consisted of various methods of identification of more than 175 types of fabrics. The major portion of the course was given by Prof Edward L Golec assisted by various members of the faculty, who demonstrated the manufacture of yarns and fabrics in the Institute's laboratories.

• Initial NETF Gifts Total $36,500

27 initial gifts totaling $36,500.00 served as a starter for the 1951 Fund Raising Campaign of the New England Textile Foundation last month, according to advice from Joseph H Axelrod, president of Wamsutta Mills and general chairman of the Campaign.

The Campaign is for the benefit of the four textile colleges in New England—Bradford-Durfee Technical Institute, Fall River, Mass, Lowell Textile Institute, Lowell, Mass, New Bedford Textile Institute, New Bedford, Mass, and the Textile School of Rhode Island School of Design, Providence, R I. The money will be used for scholarships, for subsidization of faculty salaries and for the modernization of textile college equipment.

The campaign will last until the end of the year or until the required amount of money ($250,000.00) is raised. Contributions will be solicited from the textile industry of New England and other sections of the country, and from related industries such as wool dealers, cotton merchants, yarn dealers, textile converters & selling houses, dyestuff & chemical manufacturers and textile equipment manufacturers.

Campaign Headquarters will be at the offices of the Foundation—68 South Main Street, Providence 3, R I. Gifts and pledges should be made payable to New England Textile Foundation, and may be earmarked for specific textile colleges and for specific purposes such as scholarships, if desired.

• Toyo Licensed to Produce Nylon in Japan

Following the signing of agreements in Wilmington, Toyo Rayon Company, Ltd, of Tokyo has been licensed to manufacture nylon in Japan under patents of E I du Pont de Nemours & Co, Inc. The agreement with the Toyo firm, represented by Shigeki Tashiro, chairman of the board, has been approved by the Japanese government and the Supreme Commander of Allied Powers, it is reported.

Toyo Rayon, which is manufacturing nylon on a modest scale at present, has plans for extensive operations under the agreement. Nylon is being produced by Toyo under the trade-mark "Amilan."

• TRI Incorporated in N J

Andre Blumenthal, President of Textile Research Institute, announced recently that Textile Research Institute has incorporated in the State of New Jersey as an "Institution of Learning". The new corporation succeeds Textile Research Institute, Inc, of New York.

Formal establishment of the New Jersey Corporation became effective on June 14 at which time all property, obligations, responsibilities and functions of Textile Research Institute, Inc, of New York passed from control of the old Board of Directors to the newly elected Board of Trustees of Textile Research Institute of New Jersey. The membership of the two Boards is the same.

All officers of the old corporation were also elected to similar positions with the New Jersey Corporation. They are as follows:

Andre Blumenthal—*President;* H Gordon Smith—*Vice President;* Richard T Kropf—*Treasurer;* P C Alford, Jr—*Secretary.*

Dr John H Dillon, Director of Research, has been designated Director of the Textile Research Institute in recognition of his function as operational head of all departments of the Institute. Dr James H Wakelin, formerly Associate Director of Research, succeeds Dr Dillon as Director of Research. All other staff members retain their present assignments. The Publication Department will remain at its present address at 10 East 40th Street, New York, N Y.

Upon approval of Textile Research Institute as an Institution of Learning by the Department of Education and the State Department of New Jersey and in consideration of the fact that both the administrative and operating Staffs are located permanently in Princeton, the Board of Directors recommended the corporate change to the membership which voted overwhelmingly in favor of the move.

Following the meetings of the Board, the site for the new laboratory building was inspected and approved. Revised plans call for a brick and title structure of approximately 3,000 sq ft, which will house the computing laboratories, shops, and other nonchemical installations. Construction of the building is scheduled to begin shortly.

• Japanese Mission Visits AVC

A party of six officials from the textile industry of Japan arrived in the U S late last month to follow up an investigation made earlier this year in Japan by American Viscose Corporation, the purpose of which was to see what might be worked out as a joint enterprise for the production in Japan of acetate yarn and staple.

The six Japanese, who are meeting in Philadelphia with officials of American Viscose Corporation, are K Ito, president, and Y Yamawaki and H Ito, managing directors, Dai Nippon Celluloid Co Ltd, producer of chemicals and acetate fiber; S Mori, president, and A Kikuchi, managing director, Teikoku Jinzo Kenshi Kaisha, Ltd, viscose rayon producer, and K Ohata, president of the Synthetic Textile Testing Association Foundation.

• Swain Elected Honorary Chairman, SCI

Robert C Swain, vice president in charge of Research and Development, American Cyanamid Company, New York, was recently elected Honorary Chairman of the American Section of the Society of Chemical Industry for 1951-1952. He succeeds Dr Gustavus J Esselen, consulting chemist of Boston.

Other officers elected were: *Honorary Vice Chairman*—Harry B McClure, vice president, Carbide & Carbon Chemicals Corporation; *Honorary Treasurer,* Cecil L Brown, assistant director of Research, Standard Oil Development Company; *Honorary Comptroller,* Robert Heggie, director of research, American Chicle Company; *Honorary Secretary,* Frederick W Adams, director of research, Spool Cotton Company.

Members of the Executive Committee for three years:

Bradley Dewey, Jr, Dewey & Almy Chemical Co; Ray P Dinsmore, Goodyear Tire & Rubber Co; W W Duecker, Texas Gulf Sulphur Company; Alex Stewart, National Lead Company.

Others who continue members of the Executive Committee are: L W Bass, US Industrial Chemical Co; J L Bennett, Hercules Powder Co; Gustavus J Esselen, US Testing Co; L H Flett, National Aniline Division, Allied Chemical & Dye Corp; L B Hitchcock, National Dairies Research Corp; G E Holbrook, E I du Pont de Nemours & Co; R T Major, Merck & Co; R L Murray, Hooker Electrochemical Co; and C F Rassweiler, Johns-Manville Company.

• DCAT Annual Dinner Date Announced

The 26th Annual Dinner of the Drug, Chemical and Allied Trades Section of the New York Board of Trade will be held on Thursday evening, March 6, 1952, according to a vote of the DCAT Executive Committee at its meeting on June 21.

Further details will be announced at a later date.

NAMES IN THE NEWS

• Scott Testers Elects D C Scott, Jr, President

As a result of the annual meeting of Scott Testers, Inc, held in Providence, June 15, 1951, the following officers are announced:

The newly elected president is DAVID C SCOTT, JR, who also continues as sales manager. JAMES M SCOTT continues as treasurer and production manager. DIANA SCOTT WORTHINGTON becomes secretary. WILLIAM G AHLSON, who for some time has been accountant of the firm, is assistant treasurer. Other executive personnel remain as before: HAROLD W HORTON, general sales engineer; HAROLD R RUSMUSSEN, in charge of sales, research and development of the Mooney Viscometer division; ENOCH B BOLTON, factory superintendent; and ROBERT W ROGERS, Chief engineer.

• English Joins Zurn Sales Staff

ROBERT T ENGLISH has been appointed to the sales staff of O F Zurn Company of Philadelphia. He will cover the company's Midwestern territory, including Wisconsin, Michigan, Illinois, Indiana and parts of Ohio and Minnesota.

• Scholler Reelected PTI Foundation President

FRED C SCHOLLER, president of Scholler Brothers, Philadelphia, was reelected president of the Philadelphia Textile Institute Foundation at the annual meeting of that body held last month at PTI. THEODORE B HAYWARD, manager of the wool division, Swift & Co, Philadelphia, was chosen as first vice president.

Other officers elected included Everett

I Kent, Kent Mfr Co, second vice president; Russell Osborne, R C Osborne & Co, secretary; and Richard S Cox, PTI dean, executive secretary and treasurer.

Reelected for three-year terms were: Charles W Carvin, Charles W Carvin Co; Benjamin Gibbs, Gibbs Underwear Co; Robert L Huffines, Jr, Burlington Mills Corp; and F Everett Nutter, Goodall-Sanford, Inc. Clifford S Clark, Hyde-Rakestraw Co, was newly elected to the Board of Trustees.

• LeBaron to Direct IMCC Research Labs

DR I M LeBARON has been appointed director of research laboratories for International Minerals & Chemical Corporation according to an announcement by Dr Paul D V Manning, vice president of the corporation in charge of research. Dr LeBaron has been a research engineer with International since 1942.

In his newly-created position Dr LeBaron will work with individual laboratory supervisors in developing research programs and budgets and will have responsibility of liaison with heads of development laboratories of the corporation's operating divisions. He reportedly will continue to report directly to the vice president in charge of research, and will aid him in special assignments. His offices will be in Chicago and Mulberry, Fla.

• Fletcher Joins Arthur D Little

Arthur D Little, Inc, industrial research and engineering firm of Cambridge, Mass, has announced the addition to its staff of JOHN FLETCHER, specialist in the field of varnishes, synthetic resins and protective coatings. Mr Fletcher has served with Rohm & Haas Company and Glidden Company. Most recently he operated his own laboratory, the Elmwood Research Laboratories, in North Attleboro, Mass.

John Fletcher

Mr Fletcher has been special consultant to the Charles Tiberghien Etablissement of Tourgoing, France and Woonsocket, R I. In this capacity he spent some time in England studying the wool-shrinking and coating processes developed under the Wool Industries Research Association in Leeds, England.

• Rodney Hunt Adds Sales Engineer

Rodney Hunt Machine Co gets more concentrated coverage of its Southern markets through the appointment of A P HYDE of Charlotte as Sales Engineer in North Carolina, Virginia, and Tennessee. T W KITCHEN, who supplanted the company's agency tie-up in the South in 1949, continues to represent Rodney Hunt in South Carolina, Georgia and Alabama. Increasing business and consequent service requirements had indicated need for two full time men in the area, a company spokesman said.

A P Hyde

• Gray, James Appointed to New Monsanto Posts

HOWARD A GRAY of Nahant, Mass, has been appointed group leader in the textile chemical research laboratory of Monsanto Chemical Company's Merrimac Division, according to an announcement by Dr F L Matthews, division research director.

Formerly administrative assistant in the research department, Mr Gray will be succeeded by DR WILLIAM R JAMES of South Hamilton, Mass. Both appointments are effective immediately.

Mr Gray joined Monsanto in 1935. Prior to his service as administrative assistant, he was group leader in the lacquer application and sales service section of the department.

Dr James started with Monsanto in 1947 in product and process development research.

Dr V N Morris

• Morris Heads NJACS

DR V N MORRIS, technical director of Industrial Tape Corp, New Brunswick, N J, has been elected chairman of the North Jersey Section of the American Chemical Society. Dr Norris began service in this capacity for one year on July 1.

• TRI Research Fellowship Appointees

Textile Research Institute, Princeton, N J, has announced the appointment of the following individuals to Research Fellowships for the forthcoming academic year: DAVID M CATES, PAUL C COLODNY, RICHARD L GOLDEN, SOLOMON P HERSH, LUDWIG REBENFELD and HENRY KYI-OE WOO.

Messrs Cates, Colodny, Hersh, and Rebenfeld will undertake studies in the Department of Chemistry, Princeton University. Mr Golden and Mr Woo will undertake studies in the Department of Chemical Engineering. Mr Woo will fill the Goodyear Fellowship, established December 15, 1950 by the Goodyear Tire & Rubber Company for the purposes of studying two-dimensional stress strain properties of airship type fabrics.

• Cate Wins Textron Scholarship

The New England Textile Foundation has announced that Alan C Cate of 54 King Street, Lawrence, Mass, who recently completed his Freshman year at Lowell Textile Institute, has been awarded the Textron Scholarship. The Scholarship is retroactive through the Freshman year and has a total of $2,000.00, payable at the rate of $500.00 per year for four years.

Textron, Inc, awards one new Scholarship each year at Lowell Textile Institute through the Foundation.

• Cleary Named Ass't Plant Manager

JAMES W CLEARY has been named assistant plant manager at the Hercules Powder Company plant in Parlin, where Davis S Bruce is senior assistant plant manager. Mr Cleary has been acting assistant plant manager since January of this year.

He became associated with Hercules Powder Company in 1936 as a millwright helper at the company's plant at Parlin. A month later he was named assistant power engineer. He became power engineer in 1940. Five years later, Mr Cleary assumed the post of assistant mechanical superintendent at the plant. Late in 1947, he was named acetate superintendent, a post he held until January of this year, when he became acting assistant plant manager.

NEW PRODUCTS AND DEVELOPMENTS

• Metal Specimen Containers Available for Launder-Ometer Washfastness Test #3A

Atlas Electric Devices Company, 361 W Superior St, Chicago 10, Ill, has announced that they now have available for distribution new, unbreakable specimen containers for the No 3A Tentative Accelerated Washfastness Test recently adopted by the AATCC. This new test employing metal specimen containers, which are cylinders 3½ inches in diameter by 8 inches in length, duplicates the color destruction and abrasive action of five average commercial or home launderings in one 45 minute test.

Through the use of adapters, the containers are mounted horizontally at right angles to the shaft in any standard or research model Launder-Ometer. Mounted in this fashion, the test specimens are subjected to a forceful throw, a long slide and a strong impact. The use of 100 steel balls in each container and a lower liquor volume ratio also serve to increase the abrasive action.

The tentative test is applicable to cotton or linen textiles in fabric form and is especially designed for evaluating the washfastness of colored textiles expected to withstand frequent laundering. As many as 20 samples may be tested simultaneously. Further information may be obtained by writing to Atlas.

• New Type Duller Developed by Richmond

Ronyl Duller S, a new type duller for nylon hosiery, has been developed by the Richmond Oil, Soap & Chemical Co, Inc, Philadelphia. The product, which is said to also produce a firm, flexible finish, serves as a replacement for part of the usual finish, at the same time eliminating the need for additional dullers.

The manufacturer states that the new product has been used by a few commercial dyehouses for some while "with universal approval, causing a demand for it by the concerns for whom they are dyeing". Being of the emulsion type, it is said to be easily miscible in the regular finish bath.

Richmond advises cutting down the usual finish by 30-50% and replacement with Ronyl Duller S.

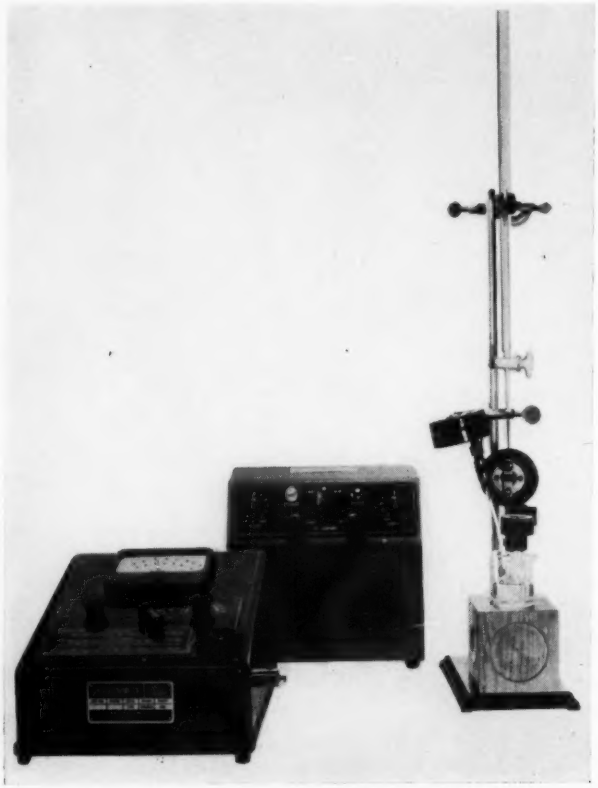
• "Autotrator" for Automatic Titration

Precise, high speed, fully automatic titration at minimum cost is provided with the least possible uses of space or time when the new Coleman Model 19 Autotrator is employed, according to Coleman Instruments, Inc, Maywood, Ill, manufacturers of the instrument.

Titrant is delivered rapidly until the end-point approaches, after which it is restricted, the final portions being added in progressively smaller increments until the true end-point is reached. Operation is controlled by the Coleman Model 18 pH Electrometer, which measures and continuously indicates the progress of the titration.

Standard laboratory accessories may be employed with the instrument.

For complete details write to Coleman Instruments, 318 Madison Street, Maywood, Illinois. (Bulletin B-223).



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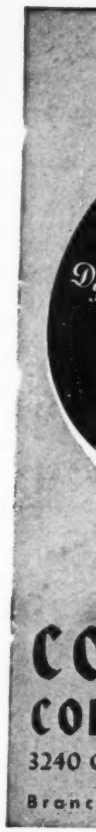

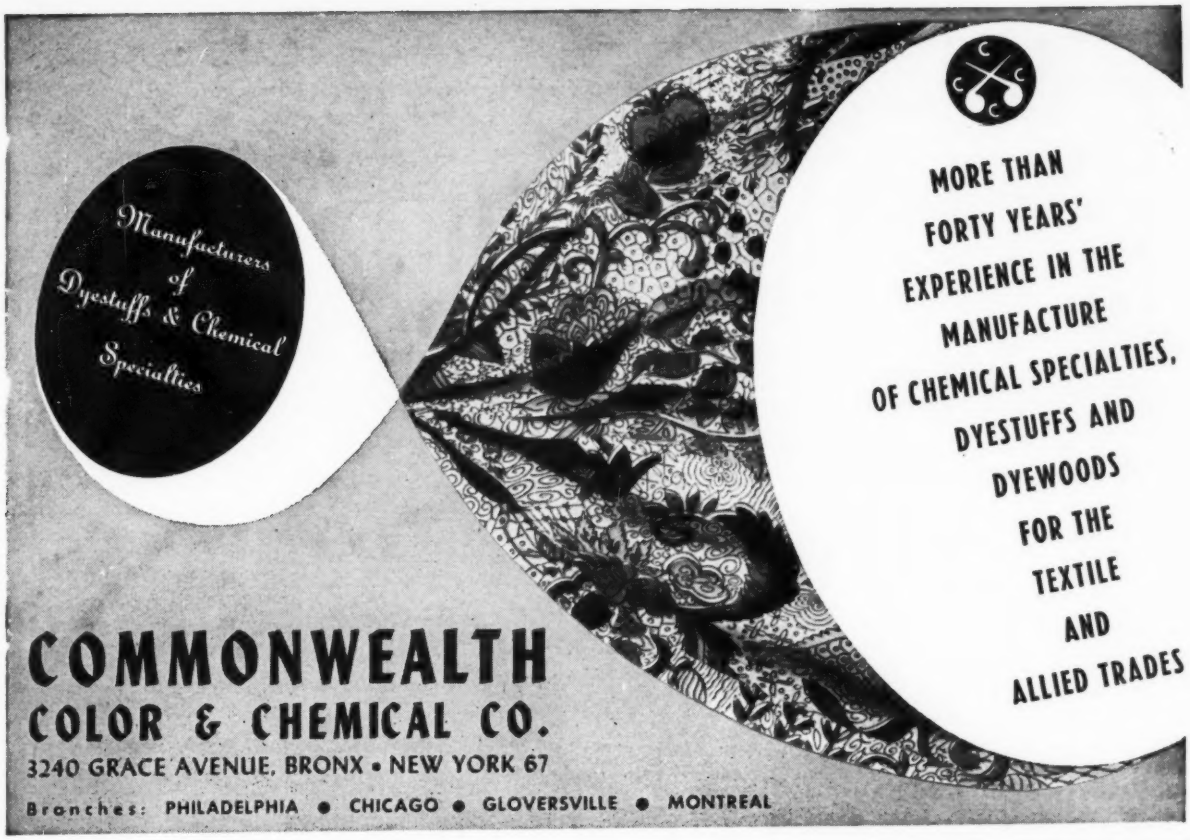
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POSITION WANTED: DYESTUFF LABORATORY TECHNICIAN COLOR MATCHER. Thoroughly experienced testing, standardizing and demonstrating all types of dyestuffs on all types of fibers. Thorough print shop and laboratory background. Complete technical knowledge. Write Box No. 152.

WANTED: Technically trained and experienced dyer for responsible position with large carpet manufacturer. Familiarity with stock, skein, and package dyeing desired. Must be able to handle wool and synthetic fibers alone or in blends, and have abilities along the lines of dyehouse organization and administration. Write Box No. 156.

TECHNICAL SALES SERVICE AND DEVELOPMENT. Large chemical manufacturer developing synthetic fibers wants textile or chemical graduate with minimum 3 years' practical experience dyeing and finishing. State age, education, experience, salary expected. Write Box No. 157.

POSITION WANTED: CHEMIST-CHEMICAL ENGINEER. Fifteen years comprehensive textile mill experience dyeing, bleaching, scouring, finishing and development research. Laboratory director. Seven years synthetic detergent manufacture and spray drying. Process engineering and trouble-shooting. Desires position as director of research including direction of laboratory. New England preferred. Write Box No. 155.

WANTED—Dyers-Assistant, on cotton yarns, rayon, in small modern package dyeing plant in metropolitan area. Experience in vats, developes, and commercial dyes essential. Write Box No. 163.

DYER AND TEXTILE CHEMIST would like to relocate. Twenty years experience in dyeing all fibers with direct, developed, acetate, sulphur, acid, milling, metallized and chrome colors. Experienced on yarns, tops, cut staple and raw stock. Write Box No. 162.

WANTED: Experienced package dyer for Rhode Island plant. Must be able to assume full charge of production dyeing, using vats, naphthols and wool colors. Only fully qualified man need apply. Replies held in strictest confidence. Write Box No. 160.

WANTED: Old established dyestuff and chemical manufacturer is increasing sales force. Desires young man familiar with synthetic fibers and woolen line. Textile graduates desired. Bright future for right man. State qualifications, experience and salary expected. All applications considered confidential. Our personnel aware of this ad. Write Box No. 164.

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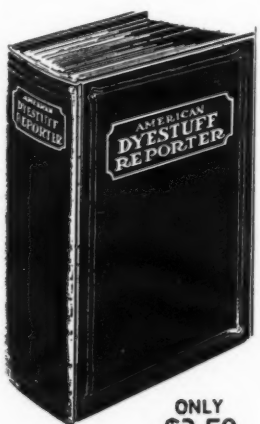

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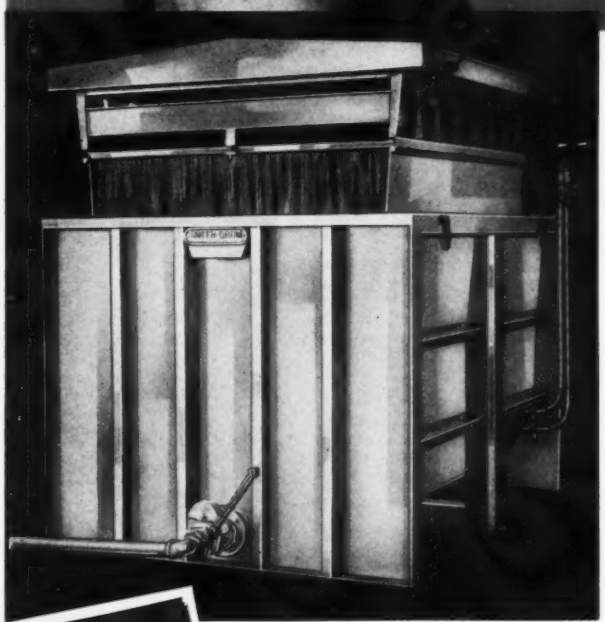

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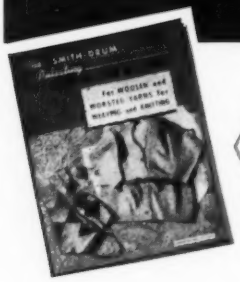

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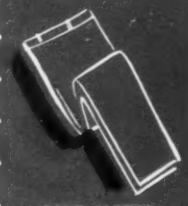

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Nylon Tenting
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Cotton Tenting
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Sleeping Bag Cloths
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WACS' and WAVES' Suitings and Dress Goods
Tackle Twills
Linings
Woolen & Worsted Suitings
Blankets
Field Jacket Cloths
Tarpaulins
Sheeting
Denims
Tickings
Flannels
Screenings
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Burlap
Glass Fabrics
Corduroys
Uniform Clothing
Undergarment Fabrics

MOSQUITO NETTINGS

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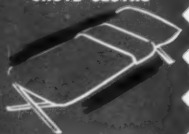

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